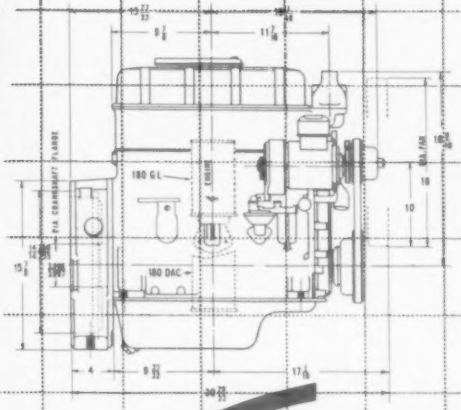
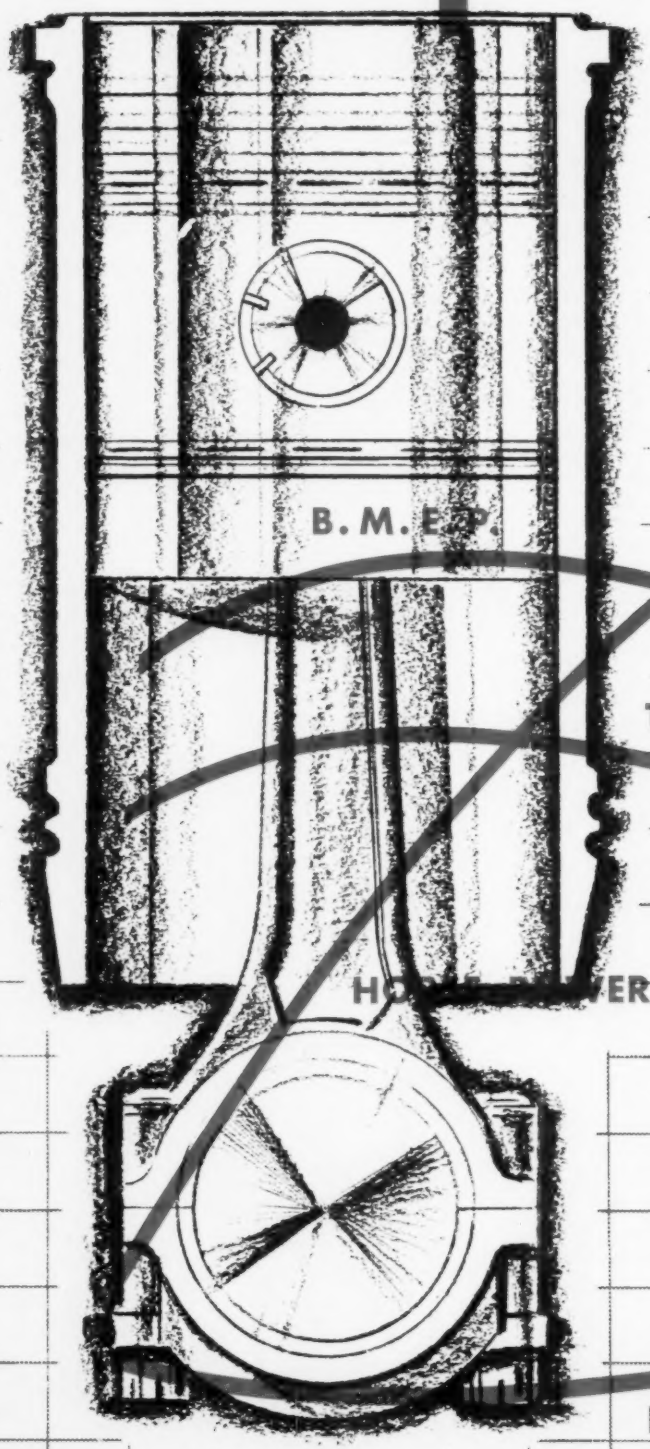
diesel power

April, 1958

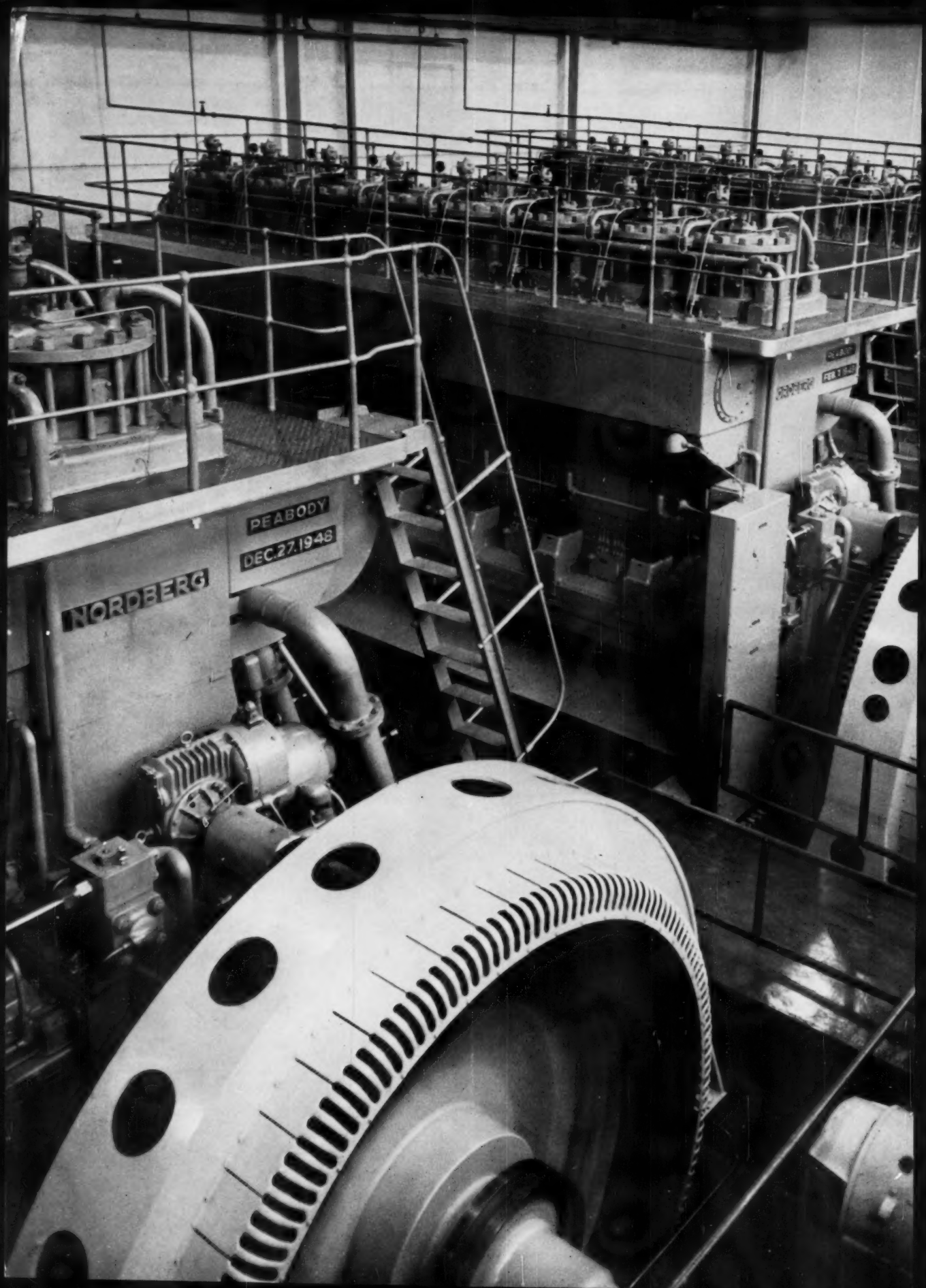




1958 ENGINE SPECIFICATIONS

- DIESEL
- DUAL-FUEL
- NATURAL GAS

$2.00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GET ALL THE POWER but spare the horses

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Texaco Ursa Oil prevents harmful deposits in diesel, gas and dual-fuel engines. It keeps rings and valves free for full compression and complete combustion . . . : and it filters beautifully.

This is what Texaco customers claim, and you can see there is a significant number of them:

For over 20 years, more stationary diesel horsepower in the U. S. has been lubricated with Texaco *than with any other brand.*

There is a complete line of Texaco Ursa Oils to meet the requirements of every diesel, gas and dual-fuel engine—regardless of make or model. A Texaco representative will be glad to suggest the one designed to keep your power output up, maintenance costs at a minimum.

Call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

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Since 1903...

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to the DIESEL INDUSTRY

CATERPILLAR—one of the leading engine manufacturers using Perfect Circle chrome rings built to its exacting specifications for both original equipment and service requirements. CAT® dealers can provide you with these genuine parts.

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Specialists in...
FLUID FLOW & VIBRATION
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AIR STARTING MOTORS
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OIL PUMPS
SHAFT SEALS

HARRISON CAPS THE HEAT!

Harrison-cooled GM Twin Diesel stays on the job 6½ years with no down time

Harrison provides endurance with assurance! This GM Twin Diesel drilled for oil on a 24-hour-a-day schedule for more than six years with no down time. And Harrison handled the heat every minute! This is typical of the rugged, trouble-free performance you can expect from Harrison heat exchangers. Harrison's 47 years' experience in the manufacture of heat-control products is your assurance of a top-quality product. If you have a cooling problem, look to Harrison for the answer.

HARRISON HEAT EXCHANGERS

Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact . . . engineered to provide the optimum in cooling efficiency.

HARRISON

GM

FORWARD FROM EIGHTY

HARRISON RADIATOR DIVISION • GENERAL MOTORS CORPORATION • LOCKPORT, N.Y.

editors notes...

You'll want to read about...

The most important factors in diesel engine sales as given by one of the most successful engine distributors in the world (Pg. 28). Here are valuable ideas that can be applied directly by engine sales organizations and adapted to other businesses serving our industry . . . .

A very effective way of cooling intake air for natural gas and gas-diesel engines (Pg. 35). Higher loads can be carried without detonation and engine performance and economy improved . . . .

Application of diesel power to a new technique of oil well drilling (Pg. 36). Faster drilling, meaning dollar savings, are reported . . . .

Details of a safety device to protect your engine (Pg. 38). Let an automatic device be your watchdog—it's cheap insurance against what could become severe damage . . . .

How to prepare cylinder or liner walls to get quick ring seating after a re-ring job (Pg. 41). Follow the principles outlined and you'll get faster break-in, better sealing and longer life of the parts . . . .

Design of a diesel-electric locomotive, custom-built for industrial service (Pg. 62). Operational requirements, plus being specialized, are often tougher than those for railroad service . . . .

You'll want to read about...

Details of a rubber-tired dozer with a 600-hp punch (Pg. 64). With 4-speed power shift transmission and torque converter drive it sets performance standards for push-loading, dozing and land clearing that are hard to match . . . .

How big construction projects start with big mobile power units moved in to supply early power demands (Pg. 66). Quick availability of substantial power supply gets the job underway fast and at low cost . . . .

Ford's new American-built diesel engine for their wheel-type tractors and how they held its cost down (Pg. 69). Basing the design on gasoline engine parts already in high production, premium cost for diesel advantages was reduced to a very low figure, improving the diesel's competitive position . . . .

How Twin Disc engineered a torque converter-master clutch "package", now standard equipment on J. I. Case's line of diesel farm tractors (Pg. 73). This is the first time that such a drive has been offered as standard equipment. Could be the start of a trend . . . .

Alco's new assembly plant in Texas to produce "power packages" for the oil industry (Pg. 78). Units are assembled closer to the point of use, thus improving availability of units, parts and servicing, and transportation is greatly simplified.

Following Page 44, you'll find the 1958 Specifications of Diesel, Dual-Fuel and Natural Gas Engines. We hope that you'll use them. This year their use can be expanded to solve many applicational and rating problems with the Diesel Dial Engine Finder. Write or use Reader Service Card for more details.

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BPA

diesel power

Established in 1923 **Vol. 36, No. 4** **April, 1958**

The Magazine of Piston and Turbine Power

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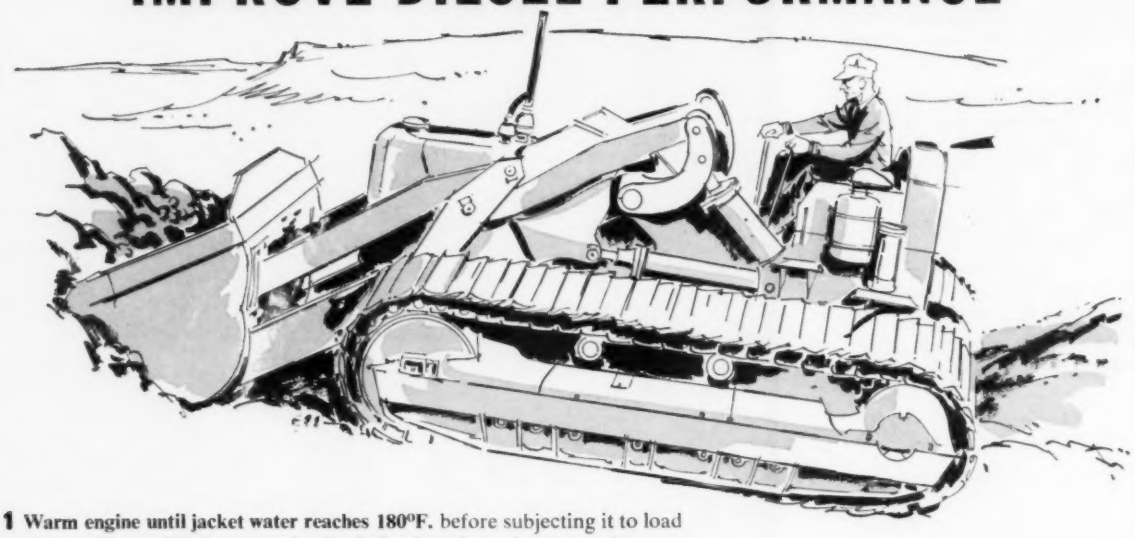
DIESEL FUEL and LUBRICATION

BULLETIN

CITIES SERVICE

HERE'S HOW YOU CAN REDUCE SLUDGE, IMPROVE DIESEL PERFORMANCE



1 **Warm engine until jacket water reaches 180°F.** before subjecting it to load conditions. If possible keep mechanized diesels in heated garage when not in use.

2 **Protect crankcase pans of mobile units** with shutters or similar devices that will insulate against icy winter blasts.

3 **Be sure fuel injection system is working properly.** If the fuel injection system permits raw fuel to reach the cylinder walls, it will impair operation by diluting with the oil and helping soot to reach the crankcase.

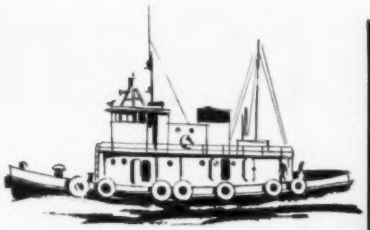
4 **Avoid sooty fuel.** Remember that a diesel engine normally produces five to eight times more soot than a gasolene engine. A dirty fuel—a fuel that produces black exhaust, will greatly increase this amount of soot.

5 **Choose your lubricating oil carefully.** Diesel engines produce more combustion impurities than gasolene engines. Consequently, it is imperative to use oil made from high-quality base stocks, with a sufficiently high additive level to protect engine parts. **For most high-speed mechanized diesels, Cities Service C-300 Motor Oil perfectly fills these requirements.** Cities Service C-300 is made from the finest base oils, strongly fortified against oxidation and corrosion. Its excellent detergent-dispersant qualities help keep insolubles in suspension, prevent engine damage. Many diesel operators credit Cities Service C-300 for doubling and tripling periods between overhaul.

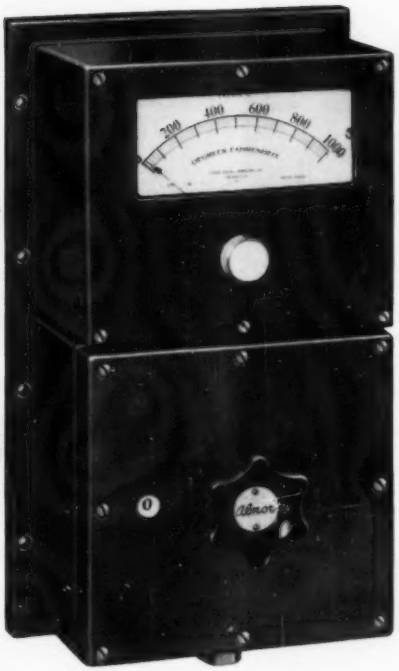
6 **When in doubt, consult a Cities Service Lubrication Engineer.** Years of specializing in lubrication problems and recommendations enable your Cities Service Lubrication Engineer to give worthwhile advice and assistance for your operation. One of these men will gladly survey your lubrication needs at no cost or obligation. Contact your nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

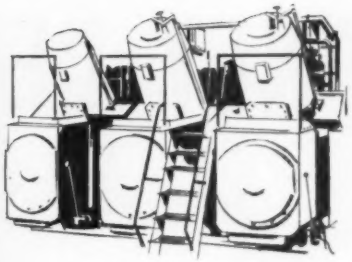
MAN YOU SHOULD KNOW

Lubrication Engineer C. J. Smith of the Cities Service office in Kansas City typifies the experienced specialists who can help you solve your lubrication problems. Wherever your plant is located—anywhere east of the Rockies—there's a nearby Cities Service office and Lubrication Engineer to serve you. For the address of the nearest office, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

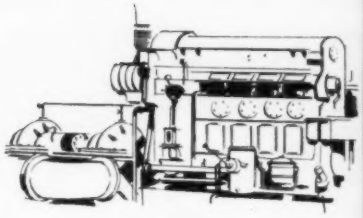


Marine

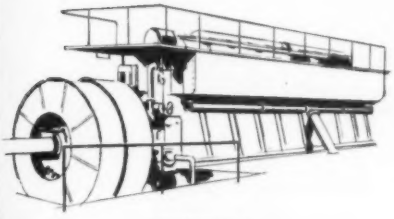




Engine compressor



Pumping



Stationary

GET THE BEST FROM THE POWER YOU BOUGHT...

WITH *Alnor*® PROTECTION

Accurate check of exhaust temperatures with an Alnor Pyrometer system can assure minimum fuel consumption per horsepower and long service from the power you bought—without the interruption of many common-cause breakdowns.

At a fraction of the cost of your present engine maintenance bill, an Alnor system can give you advanced warning of:

CYLINDER OVERLOAD	SCALED JACKETS	DETONATION
PREIGNITION	CLOGGED PORTS	FAULTY INJECTION

Series A Pyrometers are designed specifically for direct mounting on diesel engines or other equipment subject to vibration and rough usage. Readings are accurate to within + or —1%. Dustproof, fumeproof, splashproof. Switch capacities of 4, 6, 8, 10, 12 and 16 circuits. Other models to 31 circuits. Get full information—by return mail. Send for Bulletin 4361 with complete details of the Pyrometer and thermocouple assembly designed for your engine.

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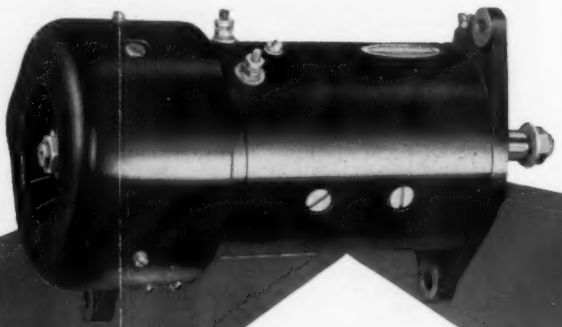
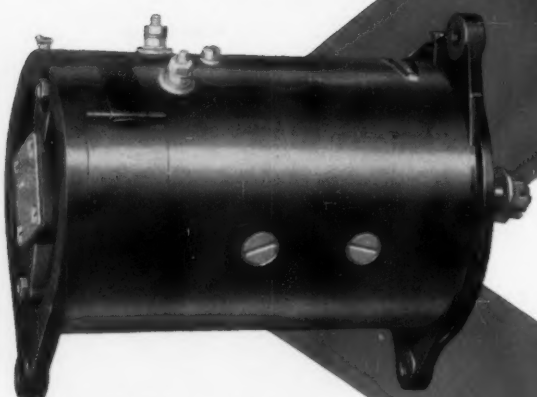


NEW TOTALLY ENCLOSED GENERATORS FOR OFF-THE-ROAD APPLICATIONS

Forced-air cooled for 50% *more* output with *no* increase in size! Splash-proof. Dust-proof. 6-, 12-, 24-volt d.c. models.



FULL LINE OF EXTRA-OUTPUT D.C. GENERATORS FOR MEDIUM- TO HEAVY-DUTY APPLICATIONS

NEW PIGGY-BACK GENERATORS

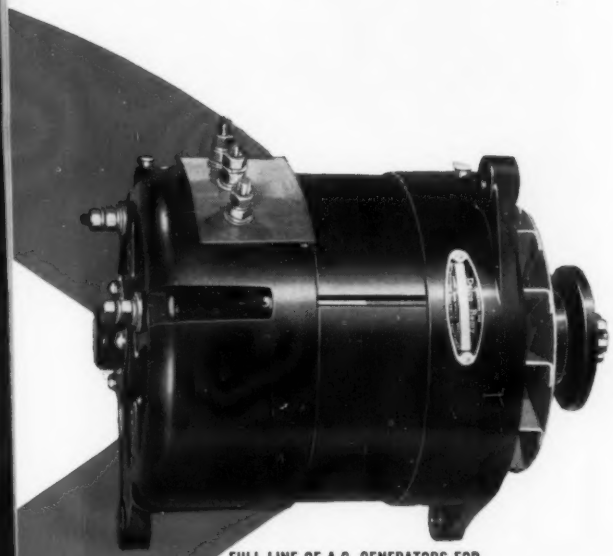
Extra power with economy! Tailored extra output in single voltage systems. You can use *both* 6- and 12-volt d.c. units on the same vehicle.

CHECK THESE EXTRA-DUTY D.C. FEATURES

- Substantial output at engine idle where required
- Greater brush area— better commutation, longer brush life
- Ball bearings at *both* drive and commutator ends
- *Sealed* field coils— impervious to moisture and corrosion
- *Double* insulated armature coils— nylon and cotton
- Hot-impregnated armature for extra insulation
- Dynamically balanced armature
- Wider, heavier brushes— service up to 100,000 miles is common

ALL THE BASES!

The only complete line of both d.c. and a.c. generators— right for your job!



FULL LINE OF A.C. GENERATORS FOR EXTRA-HEAVY ELECTRICAL LOADS

Name your generator need. Better charge at engine idle? More power for the ever-increasing demands of more and more electrical accessories? Lower replacement cost for lighter duty operation?

You name it. Delco-Remy meets it. Delco-Remy, in fact, has the *only* complete line of both d.c. and a.c. generators with matching waterproof regulators to meet every fleet requirement. Whether you haul light loads or heavy loads—off the road, around town, or across the nation—at highway speeds or in creeping traffic—Delco-Remy has the *right* generator to fit your need.

The complete Delco-Remy line brings you this important benefit: When you buy these extra-duty generators through the United Motors System, or from your vehicle dealer, you get the tailored performance you need—at minimum cost.

Specify Delco-Remy extra-duty generators on your new equipment, and for replacement on your present equipment. Only the complete Delco-Remy d.c. and a.c. line covers all the bases to fit every generator need.

CHECK THESE SUPERIOR A.C. FEATURES

- Greater output at engine idle
- Dependable performance at all operating speeds
- *Exclusive* self-regulating current control— *no current regulator or limiter needed*
- *Exclusive* stainless steel slip rings
- Extra-large ball bearings at *both* drive and commutator ends
- Shaft-keyed rotors prevent high torque slippage
- Easy all-around maintenance— positive oiler lubrication

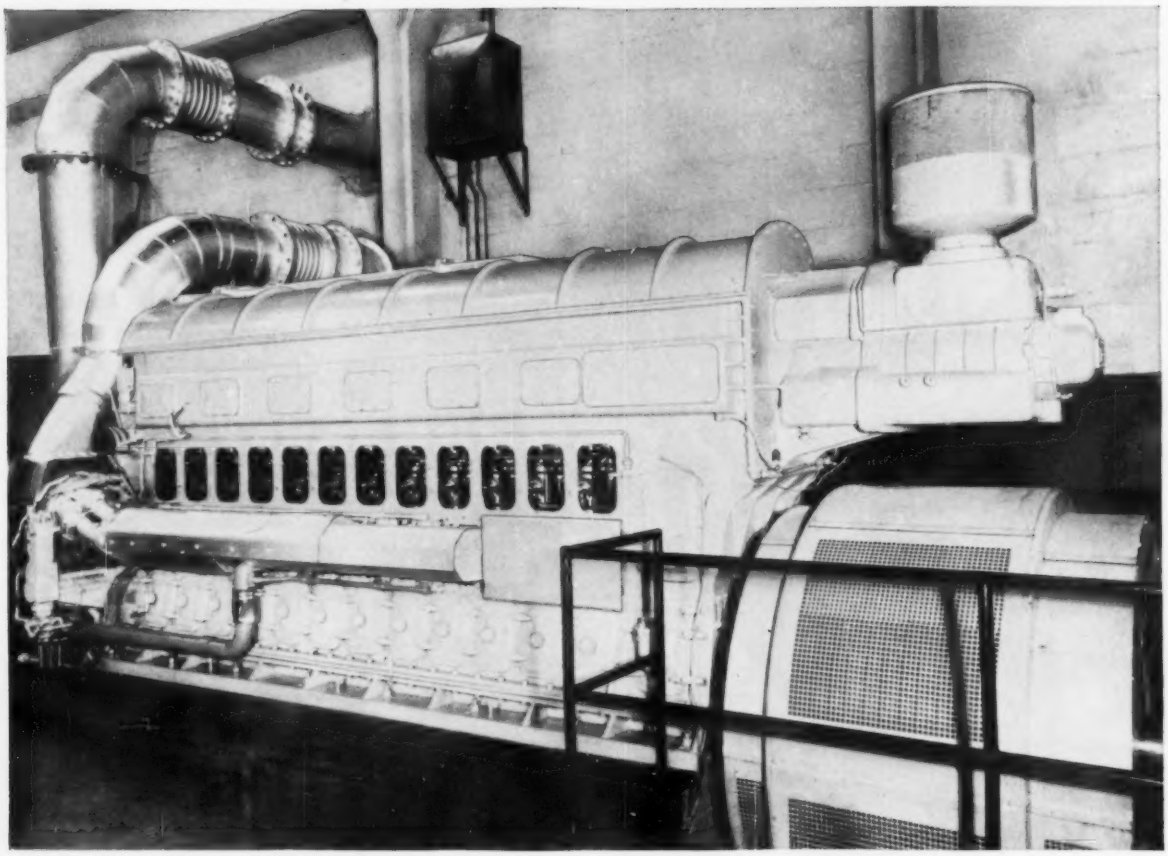
GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy

ELECTRICAL SYSTEMS

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

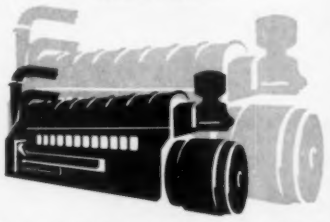
NOW Fairbanks-Morse
TURBOCHARGED



Now from Fairbanks-Morse comes the year's most significant power news: the Opposed-Piston diesel is turbo-supercharged!

Backed by 20,000 hours of actual operation and research, this new, yet proved, design increases O-P horsepower by 50%. At 900 rpm., for example, the turbocharged O-P is conservatively rated at 300 hp. per cylinder. Combining simple, two-cycle Opposed-Piston design of engine with new Fairbanks-Morse-designed system of turbocharging produces compact, reliable power with low operating and maintenance costs. None of the basic O-P advantages have been eliminated. In fact, many parts are interchangeable between turbocharged and non-turbocharged Opposed-Piston engine models.

More Power

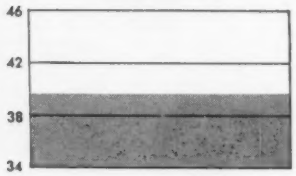


The un-turbocharged O-P is the industry's leader in compact power . . . now 50% more power can be placed in the same installation with the same size turbocharged O-P.

Lower Weight

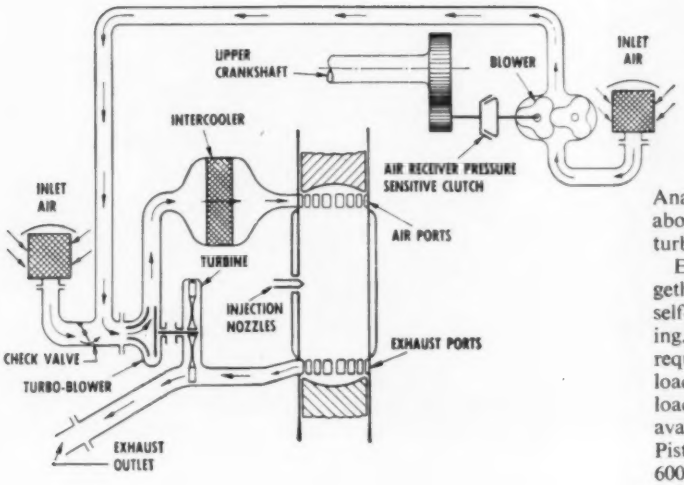
—per horsepower. Increased O-P power is more widely applicable where weight and foundation costs are restrictive. Weight per horsepower has been reduced by 27%.

Increased Thermal Efficiency



The new, performance-proved thermal efficiency of the turbocharged Fairbanks-Morse Model 38TD-8⅛ O-P diesel is knocking on the door of a new high of 40% efficiency.

OPPOSED-PISTON DIESEL
50% MORE POWER
for Marine and Stationary Applications



Matched Engine and Turbocharging

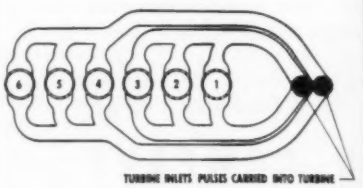
Analysis of many turbocharging options established the above arrangement for optimum performance of the turbocharged Opposed-Piston diesel.

Exact matching of O-P engine and this system, together with manifold design, results in an engine that is self-sustaining over the entire load range, including starting. The small engine-driven auxiliary blower meets the requirements of sudden, large load changes at fractional loads only—and is automatically declutched above ⅓ load. Power formerly used for blower drive is therefore available at the flywheel of the turbocharged Opposed-Piston Diesel. Fairbanks, Morse & Co., Dept. DIP-4 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

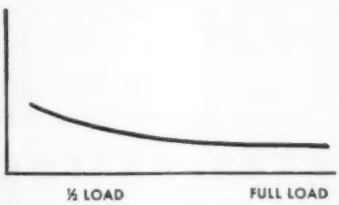
DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Pulse System



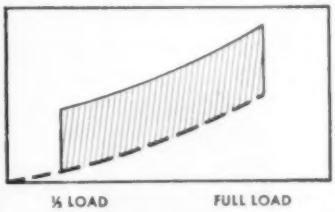
F-M exhaust manifolding carries peak pulse energy directly to the turbine drive, thus taking full advantage of additional driving force available in these exhaust pulses.

Lower Fuel Consumption



For full-load operations, specific fuel consumption of the turbocharged O-P is 5% to 10% lower than un-turbocharged O-P—and very much lower for part loads.

Bonus Power



At loads above approximately ⅓ rating, the auxiliary blower is automatically declutched, thus making additional, usable power available at the flywheel.

ROUTINE or EMERGENCY

There's a WOODWARD SERVICE PLAN to meet your requirements

Woodward service assures proper installation of all the latest improvements. Our experienced personnel have at their disposal the very finest tools, testing equipment and special plant facilities to rebuild any Woodward governor in a minimum of time.

Very often, due to the addition of latest improvements, your rebuilt unit will outperform the same governor when it was new. A new governor guarantee covers work done in our plants.

Here are four ways to have your governor put in "like new" condition.

1. REPAIR AND RETURN
While your engine is shut down for other work, send the governor to our Rockford, Illinois, plant. List the governor serial number on your purchase order and make sure your company name is on the crate. Give shipping instructions and be sure to tell us when you want it back.

2. GOVERNOR EXCHANGE
Tell us when you intend to make the installation. We'll ship a governor like yours but with all the latest improvements. You can quickly install the new unit. Send the old governor to us. The cost — round trip shipping plus time and material to overhaul your old governor for our exchange stock.

3. EMERGENCY SERVICE
For real emergencies we'll send a man to your plant, with a governor if necessary. Our fleet of airplanes is ready to rush men and material to cope with the situation. Rare but very real emergencies usually can be handled in one day or less.

4. YOUR OWN SERVICE
Some competent field mechanics, experienced in small parts assembly, repair their own governors in the field. Send us the serial number of the unit, tell us what it's controlling and inform us of any suspected deficiency. We'll send Instruction & Parts bulletins and suggest parts you may need.
If you have a number of governors, send your mechanic to our plant for two to four days training. Travel and living expenses are the only costs.

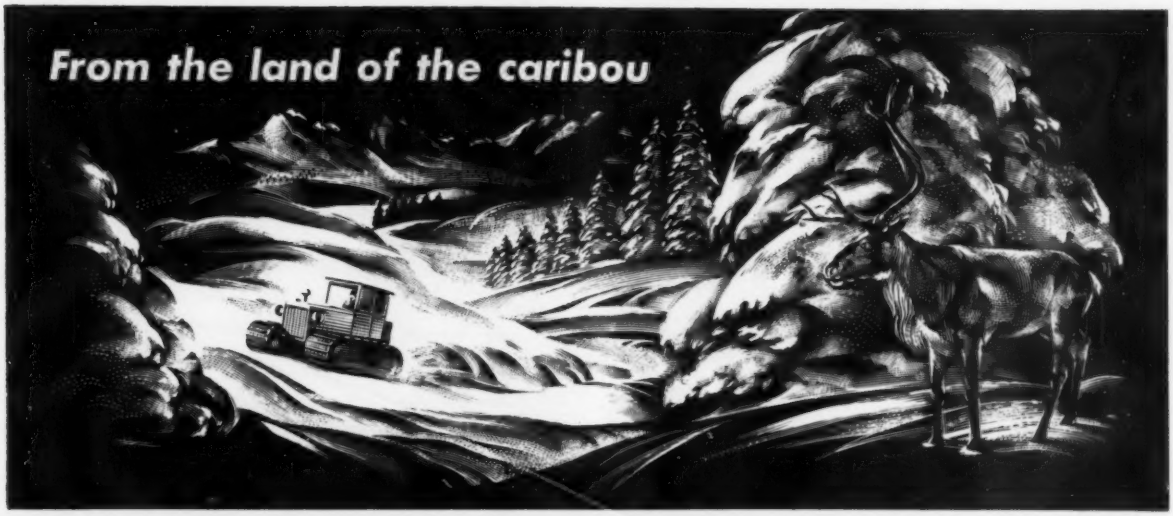
Similar services are available to our European customers at our Schiphol, Netherlands, facility.

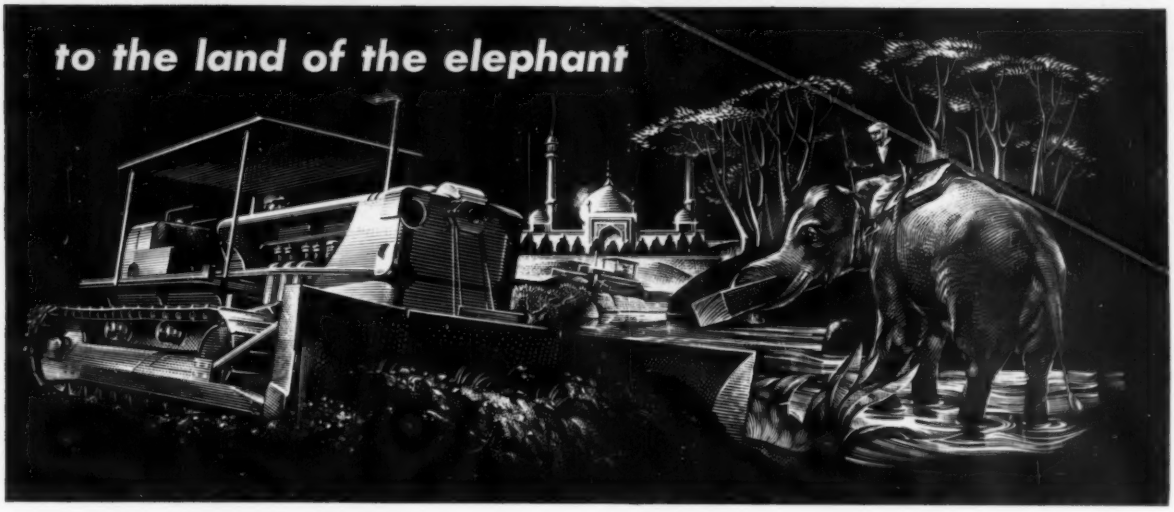
WOODWARD GOVERNOR COMPANY

ROCKFORD, ILLINOIS

Fort Collins, Colorado — Schiphol, The Netherlands

WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY





Other Outstanding Shell Industrial Lubricants

Shell Tellus Oils—for closed hydraulic systems

Shell Talona R Oil 40—anti-wear crankcase oil for diesel locomotives

Shell Alvania Grease—multi-purpose industrial grease

Shell Turbo Oils—for utility, industrial and marine turbines

Shell Dromus Oils—soluble cutting oils for high-production metal working

Shell Macoma Oils—for extreme pressure industrial gear lubrication

Shell Voluta Oils—for high-speed quenching with maximum stability

Its performance and name are the same around the world

Shell Rimula Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

One of these problems—excessive cylinder and ring wear—results from acidic combustion products. It occurs under all operating conditions, but is especially severe under low jacket temperatures. Rimula® Oil contains an alkaline additive that counteracts this acid wear. It remains stable under the widest temperature extremes encountered in modern operation. It keeps engine parts clean and operating efficiently over longer periods . . . effecting worthwhile savings in labor and parts.

Rimula Oil is available to your customers abroad. They can depend upon it for the most severe conditions of diesel operation. For full information, write: Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California.

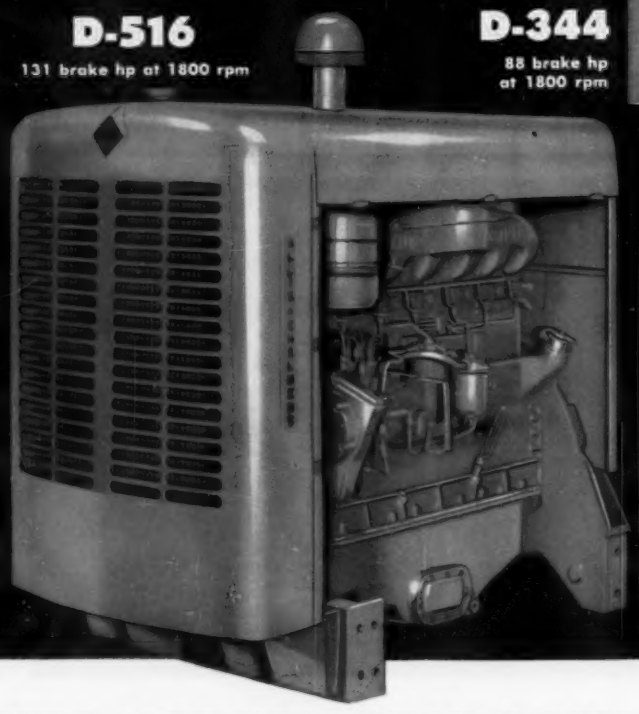
SHELL RIMULA OIL

SHELL

2 new ALLIS-CHALMERS DIESELS

D-516
131 brake hp at 1800 rpm

D-344
88 brake hp at 1800 rpm



. . . with

DO MORE POWER

THEY'RE ALIVE WITH WORK-POWER AT SPEEDS YOU CAN USE!

These two completely new Allis-Chalmers diesels give you real *Do-More Power* — high-torque power that puts maximum turning effort on a shaft at the "bread and butter" speeds you actually use. They are smooth, steady, responsive to give you more profitable performance wherever you use them.

Follow-through combustion results in top fuel economy, lower operating costs.

BRIEF SPECIFICATIONS	D-344	D-516
Piston displacement, cu in	344	516
Bore and stroke	$4\frac{7}{16} \times 5\frac{5}{16}$	
Cylinders	4	6
Maximum bare engine horsepower (at 1800 rpm)	88	131
Power unit horsepower (at 1800 rpm)	79	122
Maximum torque at rpm	278 @ 1000	392 @ 1300
Fuel	No. 2 Comm. Diesel	
Types	Fan to flywheel engines Open or closed power units.	

Strength flows from end to end through husky, forged steel crankshaft.

Positively controlled cooling and lubricating works wonders with efficiency and engine life.

4-cycle simplicity fortifies your work-power, gives you more for your engine dollar.

Built-in safeguards provide protection, help assure dependable performance.

Ruggedness throughout means bonuses in long life, more operating hours per dollar.

Call your Allis-Chalmers engine dealer. Get the complete story on these and other Allis-Chalmers *Do-More Power* engines — 9 to 516 horsepower; operating on diesel fuel, gasoline, LP or natural gas.

ALLIS-CHALMERS,
ENGINE - MATERIAL HANDLING DIVISION,
MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BC-13

FIRST in diesel fuel injection

FIRST in gasoline injection, too

Of course, you recognize this trademark — the trademark of ROBERT BOSCH GMBH Stuttgart, Germany — pioneer in the diesel injection field. For over 30 years diesel fuel injection equipment bearing this trademark has had no peer for precision, quality, long use dependability.

Now, history is repeating itself. ROBERT BOSCH, pioneer also in the gasoline injection field, has already been building for several years, the same solid reputation for its trademark on gasoline injection equipment.

ROBERT BOSCH CORPORATION

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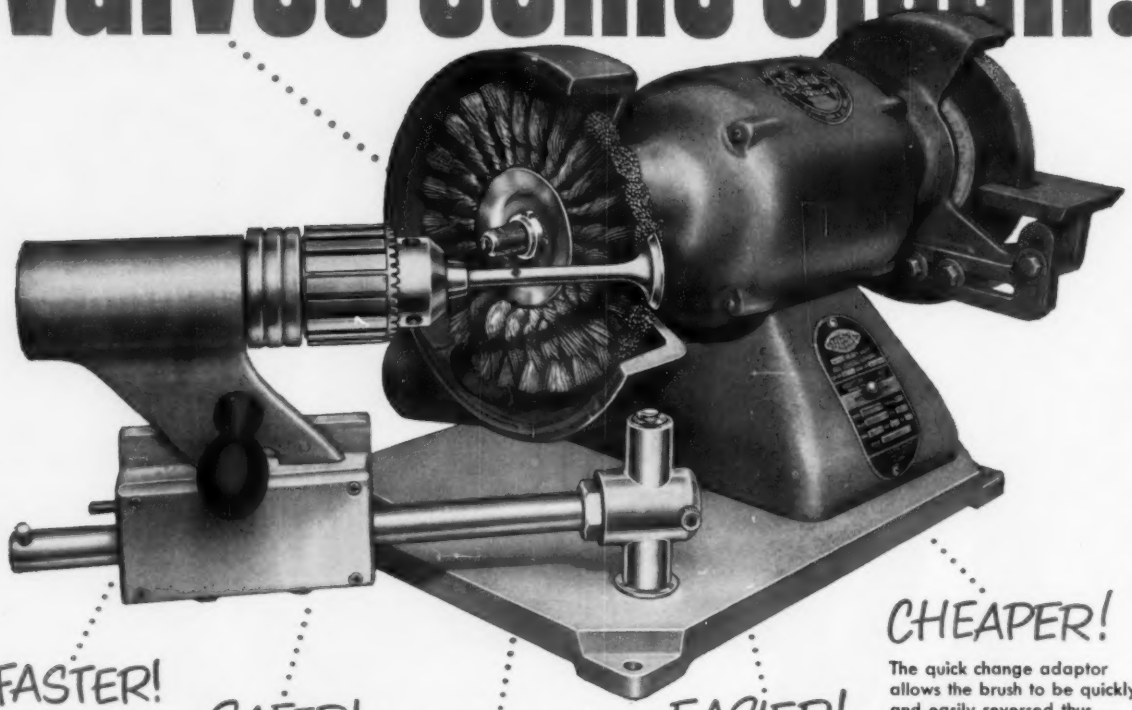
*Registered U. S. Pat. Office, ROBERT BOSCH GMBH, Manufacturers of ROBERT BOSCH Products

Valves come clean!



FASTER!
Valves can be cleaned in 15 seconds.

SAFER!
Chuck holds valve; fingers are never near wire brush.

BETTER!
Hardest carbon deposits disappear, leaving a clean, shiny surface.

EASIER!
Takes the drudgery out of valve cleaning. The machine does the work. No skill required.

CHEAPER!
The quick change adaptor allows the brush to be quickly and easily reversed thus bringing sharp cutting points into play. Dull brushes stop cutting. Frequent reversing triples the life of the brush.

WITH THE NEW SIOUX VALVE CLEANER ATTACHMENT

REVERSING KEEPS SHARP EDGES AT WORK

QUICK CHANGE ADAPTOR

The SIOUX Valve Cleaner can be supplied with bench grinder as shown or sold as an attachment to fit an existing 6″, 7″, or 8″ bench grinder. It's another entirely new product exclusively from SIOUX to you.

SIOUX

ALBERTSON & CO., INC.
SIOUX CITY, IOWA, U.S.A.

LOOK UNDER "TOOLS—ELECTRIC"

NEW AIR IMPACT WRENCHES • NEW AIR SCREWDRIVERS • NEW "PELICAN" NUT ACCUMULATORS • ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • SCREWDRIVERS • PORTABLE SAWS • VALVE FACE GRINDING MACHINES • FLEXIBLE SHAFTS • ABRASIVE DISCS

3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

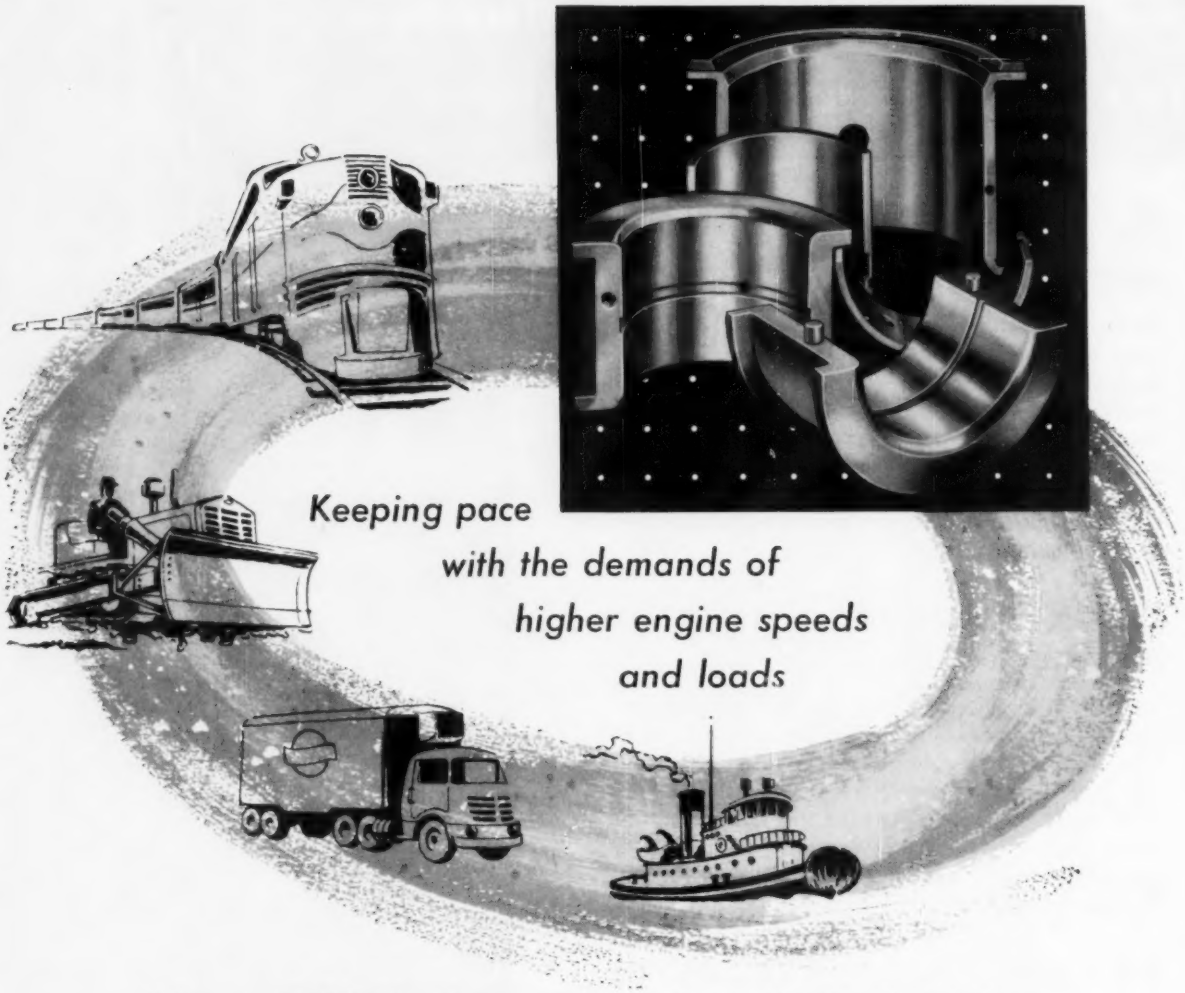
De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines.

You'll find additional data in these De Laval Bulletins. Write for your copies.

DE LAVAL

Steam Turbine Company

TRENTON 2, NEW JERSEY



Johnson Solid Aluminum and Aluminum-On-Steel Bearings

For better performance, and to meet the demands of engine manufacturers, Johnson Bronze pioneered the development of solid aluminum and aluminum-on-steel bearings.

Solid aluminum bearings carry loads up to 4000 psi, and aluminum-on-steel to 6000 psi. These bearings have excellent embeddability properties, are ductile enough to conform to slight misalignments, and have high resistance to acid formation and attack by additive oils.

Johnson aluminum bearings are available in a wide range of plain or flanged, full or half bearings, with or without precision overlay. Take advantage of our years of experience in aluminum bearing design and production—your Johnson representative will be glad to work with you in improving the performance of your engines.

Johnson Bronze

470 South Mill Street • New Castle, Pa.

Subsidiary—Apex Bronze Foundry Company, Oakland, California

JOHNSON Bearings

POWDER METALLURGY—BRONZE OR IRON

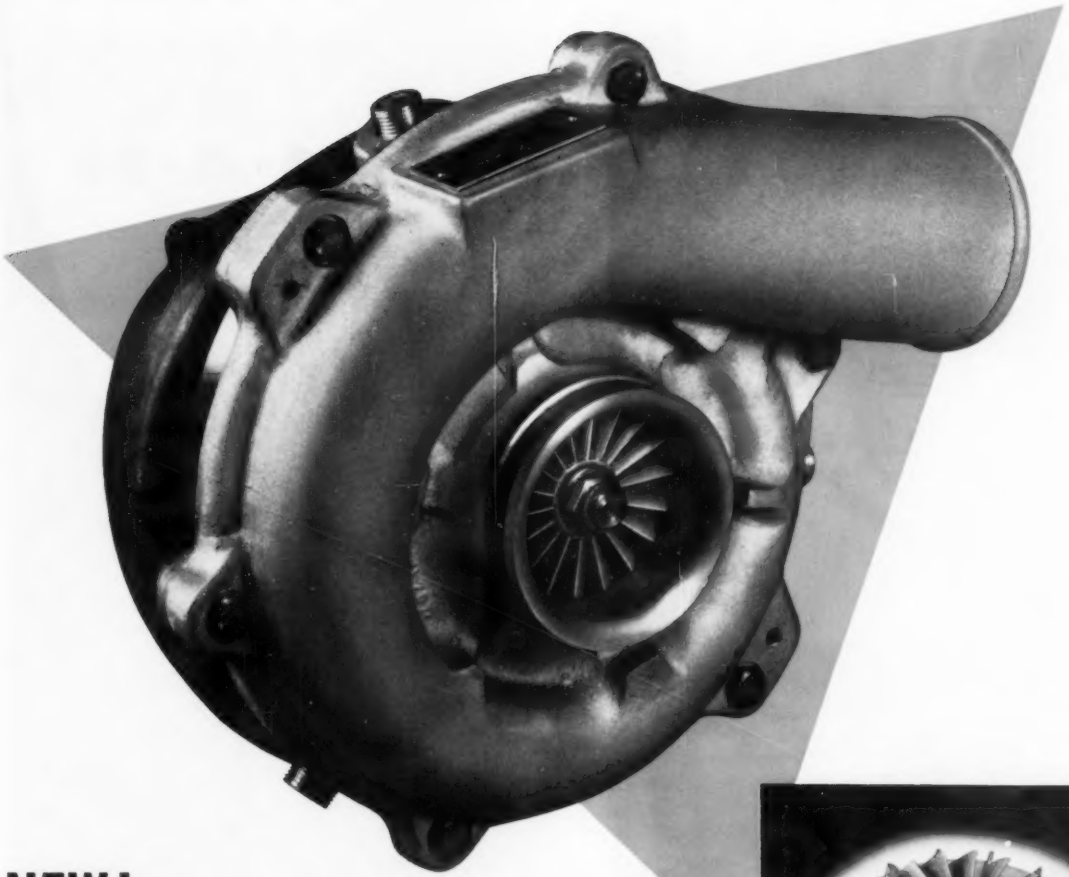
ALUMINUM ON STEEL SOLID ALUMINUM

BRONZE ON STEEL

STEEL AND BABBITT

GRAPHITED BRONZE

BRONZE—CAST OR ROLLED



NEW! High-pressure supercharging at low rotor speeds with Thompson Turbocharger

Simple, straight rotor vanes enable the new-design Thompson Turbocharger to produce economical high-pressure blowing of diesel engines even at low rotor speeds. Wear on parts is reduced, maintenance and downtime are kept to a minimum.

In the development labs of the Jet Division, impeller vane contours were developed to make use of Thompson's two decades of experience in high efficiency movement of air and gases.

Other *new* features of Thompson Turbochargers include unique small-diameter shaft and bearing to provide lower shaft surface speeds at equal compression ratios. Bearing and shaft wear is kept to a minimum. In addition, unique Thompson design keeps exhaust heat from traveling to bearings and compressor side of the Turbocharger.

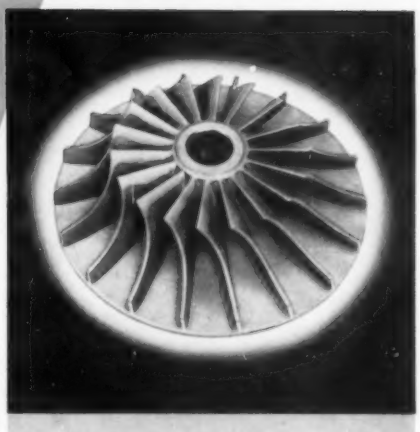
If you build supercharged diesel engines up to 300 horsepower, we can supply a Thompson Turbocharger to provide even more horsepower and fuel economy. If you install diesel engines in trucks or diesel-powered equipment, you'll increase horsepower without increasing engine size by specifying Thompson Turbochargers.

Our sales engineers will help you make the switch to Thompson Turbochargers with practically no redesign of exhaust or intake side. When may they call?

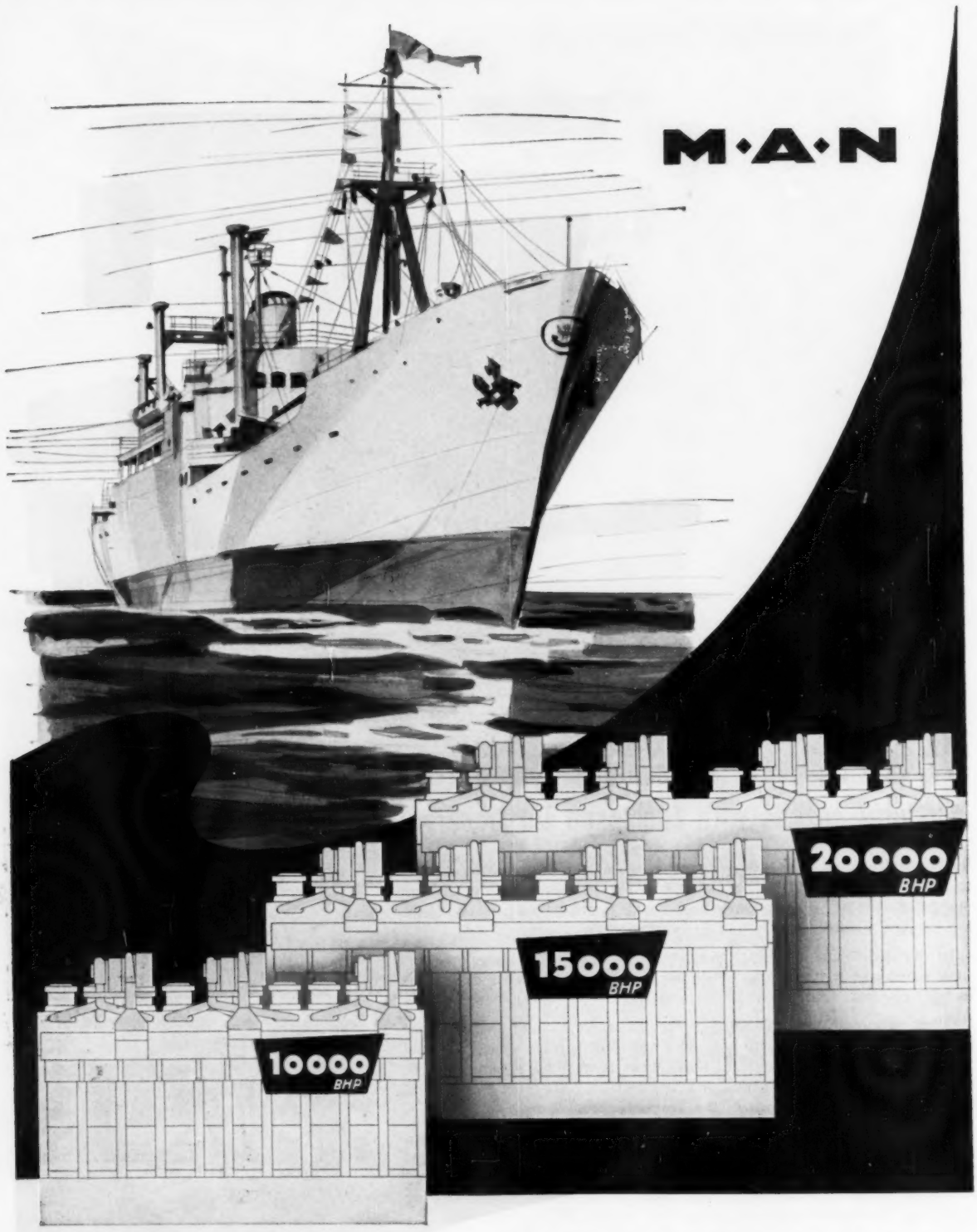
JET DIVISION

Thompson Products, Inc.

Cleveland 17, Ohio



Write today on your company letterhead for Booklet DP-458, which contains technical data on Thompson Turbochargers for blown diesel engines up to 300 horsepower.

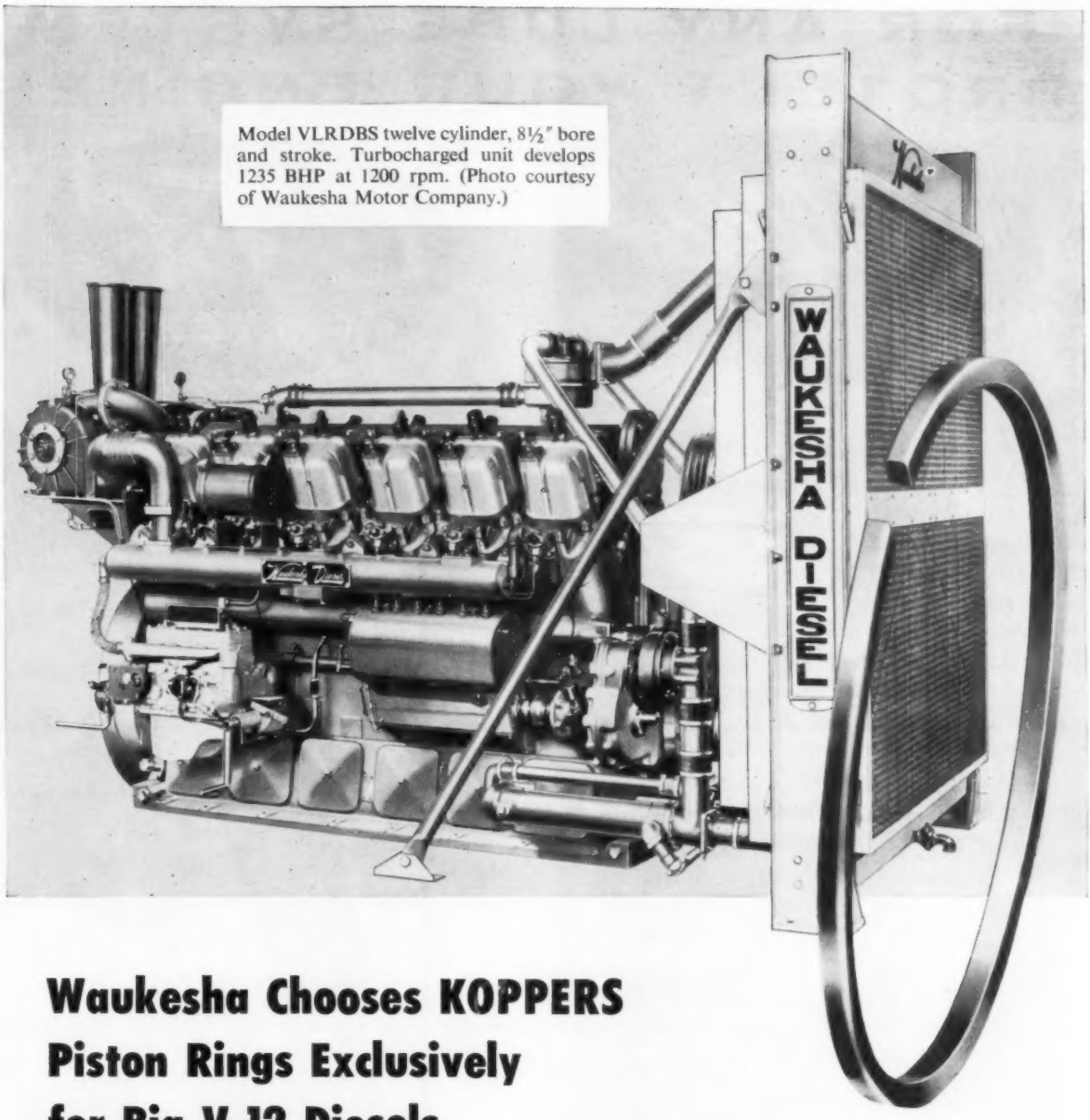


M. A. N. Diesel Engines are built in 11 countries by 25 licensees

TURBO-CHARGED TWO-STROKE
MARINE DIESEL ENGINES
WITH 5 TO 12 CYLINDERS

MASCHINENFABRIK AUGSBURG-NÜRNBERG AG · WERK AUGSBURG
GERMANY

REPRESENTED ALL OVER THE WORLD



Model VLRDBS twelve cylinder, 8½" bore and stroke. Turbocharged unit develops 1235 BHP at 1200 rpm. (Photo courtesy of Waukesha Motor Company.)

Waukesha Chooses KOPPERS Piston Rings Exclusively for Big V-12 Diesels

Waukesha's VLRDBS supercharged diesels are perfectly suited for applications such as oil rigs, excavators and tugboats where a surge of reserve power is essential for emergency and overload demands.

This recent series of diesels manufactured by the Waukesha Motor Company, of Waukesha, Wisconsin, is designed to develop tremendous power under the severest operating conditions . . . the kind of power that puts a premium on piston ring performance. Waukesha has selected Koppers Piston Rings as have other manufacturers who must be certain of reliable component performance.

This dependability is yours when you rely on Koppers with their complete range of materials . . . wide selection of types and sizes . . . rigid quality control and careful inspection. These factors contribute to Koppers unchallenged leadership in producing the finest piston and sealing rings for industry.

Instead of undergoing needless expense in solving ring problems, take advantage of Koppers experience, research facilities and craftsmanship. Write for information today. KOPPERS COMPANY, INC., Piston Ring and Seal Dept., 1304 Hamburg St., Baltimore 3, Md.

★ **KOPPERS DEPENDABLE RINGS CONTRIBUTE TO WAUKESHA'S RELIABLE PERFORMANCE UNDER THE MOST RUGGED CONDITIONS.**

KOPPERS

AMERICAN HAMMERED
Industrial Piston Rings
Engineered Products Sold with ***Service***

FOR ANY LUBE SYSTEM PROTECT YOUR ENGINES WITH

Fulflo FILTERS REG U.S. PAT. OFF

CFC FILTERS

For Full-Flow DEPTH Filtration:

Fulflo Filters with genuine Honeycomb Filter Tubes provide true depth filtration at high or low flow rates for stationary engines, mobile engines or bulk fluids. Every drop is filtered finer and finer — through hundreds of precision controlled filtering tunnels. These diamond-shaped tunnels are engineered for exact uniformity in size, shape, depth and density. Contaminants are securely trapped in inner storage cells.

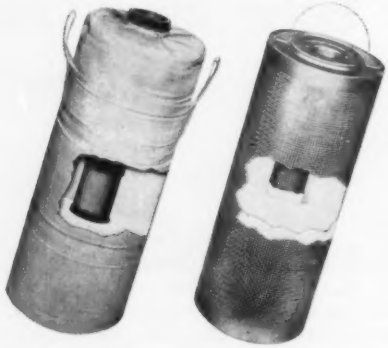
For Full-Flow SURFACE Filtration:

CFC Flo-Pac is offered in a variety of models using 1 to 36 resin-impregnated paper cartridges. Each cartridge provides more than 6300 square inches of filtering surface.

For By-Pass Systems:

CFC Multi-Cartridge Filter offers seven types of interchangeable cartridges — inert media for solid contaminants or Cranite (fuller's earth) for removal of solid particles and all products of oxidation. CFC Michiana Filters are also available in a variety of models for rugged service within minimum space requirement.

For new catalog, write today to Department DR



COMMERCIAL FILTERS CORPORATION

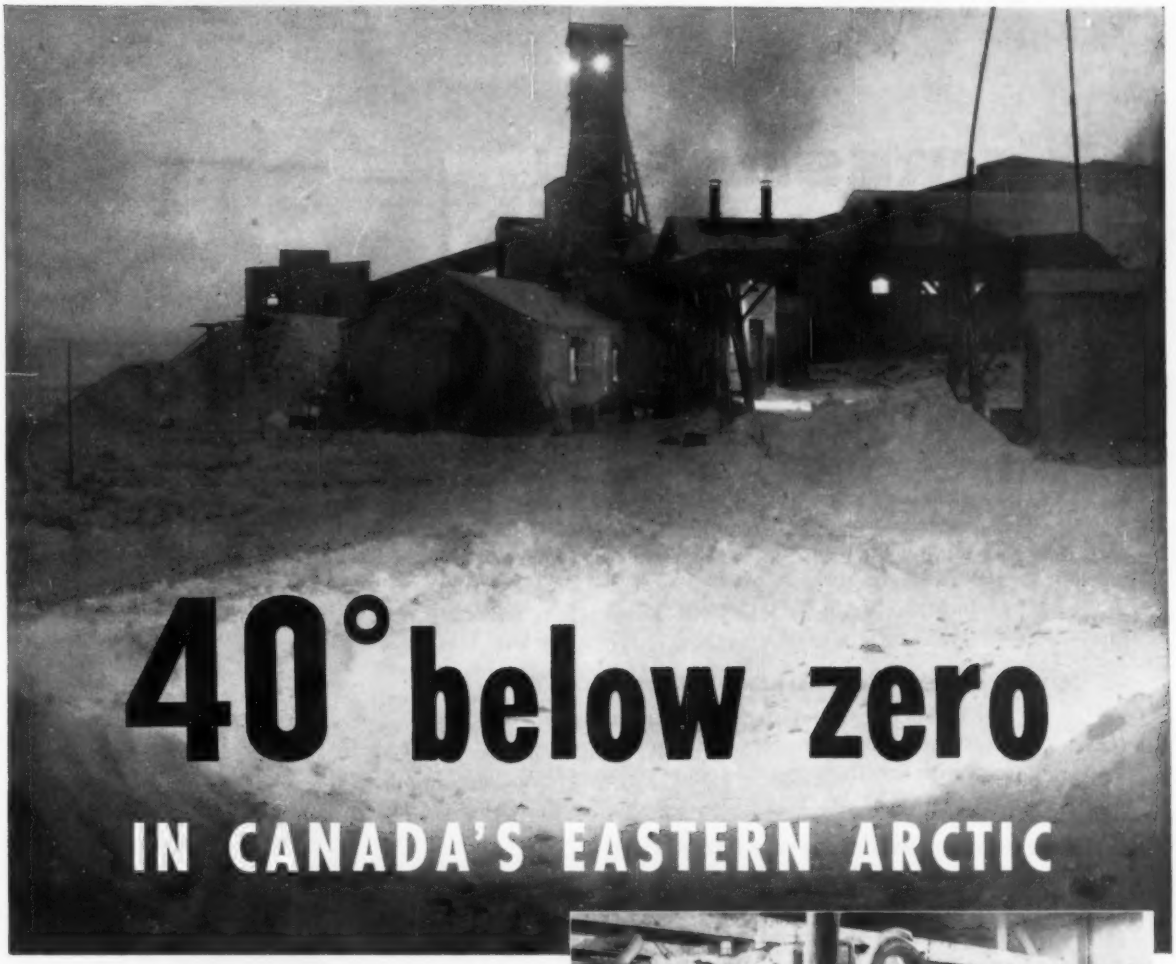
MELROSE 76, MASSACHUSETTS

PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

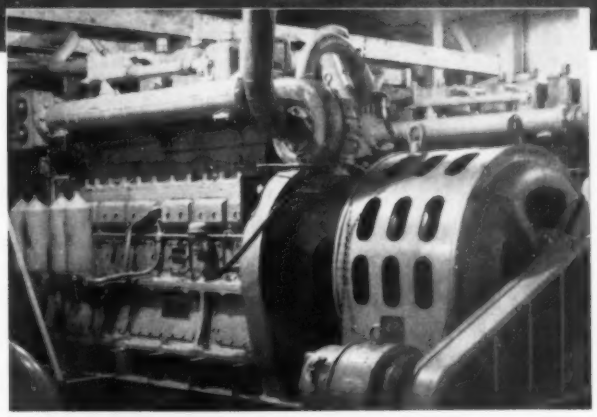
Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*



40° below zero

IN CANADA'S EASTERN ARCTIC



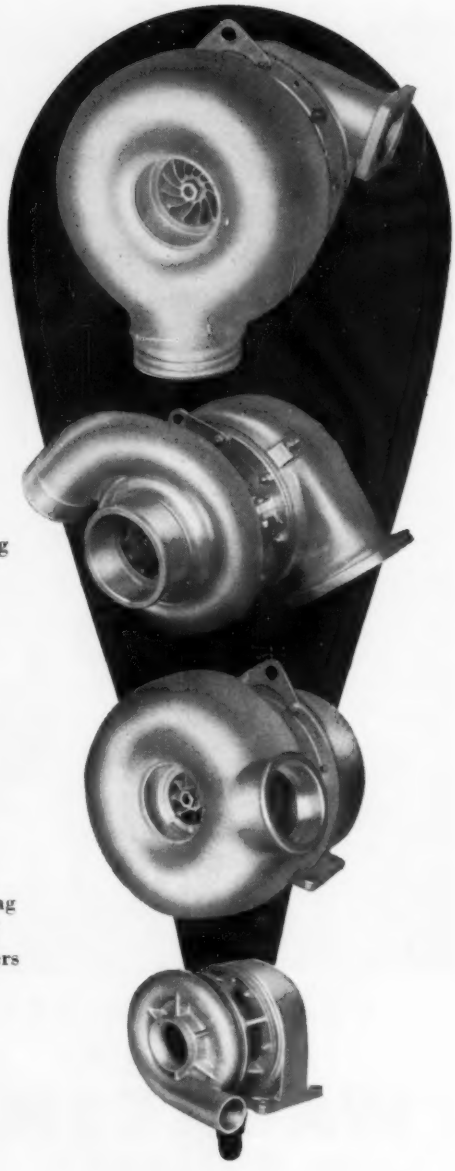
GENERATOR SETS
powered by
WAUKESHA
Diesels
supply all electric power for mine, mill, townsite and camp

On a northern inlet of Hudson Bay, 1950 air miles northwest of Toronto—where daytime temperatures hit 40° or more below zero, and the miners are Eskimos—is Canada's most northerly nickel mine. In so remote a spot the powerhouse engines must be reliable. They are. Both are Waukesha Diesels. They drive the generator sets that supply *all* electric power for mine, mill, townsite and camp of the North Rankin Nickel Mines, Rankin Inlet, Northwest Territory, Canada. Production is 250 tons daily; ore is high grade and shipping concentrates run 13% nickel; 2.5% copper. The two Waukesha Diesels are Model LRDBS Turbo-supercharged 6-cyl., 8½ x 8½ in., 2894 cu. in. engines. ● Waukesha Enginators (engine-driven generator combinations) for Diesel, gas, or gasoline fuels are also available up to 800 KW. Send for literature.

373

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN • New York • Tulsa • Los Angeles

AIRESEARCH TURBOCHARGERS ANSWER "YES!" TO...



increased power?

Your engine's output can be raised up to 100%, depending on its design and application. Incorporating the most efficient turbine wheels in the industry, AiResearch turbochargers can give sea-level performance up to 12,000 feet.

lower specific fuel consumption?

The turbocharger improves engine combustion, resulting in important fuel saving per horsepower even with greatly increased engine power output.

lower engine thermal loading?

Efficient compressor wheel design holds heat-producing turbulence to a minimum, providing a smooth flow of compressed air to the engine. AiResearch turbochargers are also air-cooled, eliminating the need for complicated plumbing.

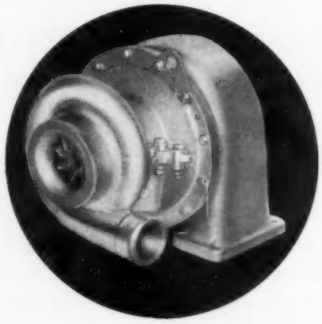
less noise and smoke?

Engine noise level is greatly decreased. Smoking is often completely eliminated.

reliability and durability?

Excellent reports on more than 13,000 AiResearch units at work in the field emphasize these qualities. AiResearch turbochargers require no attention between normal engine overhaul periods.

Your inquiries are invited.



THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

Editorially speaking -

Let's NOT "Wait and See"

Every one of us is both a producer and a consumer. Apparently, a lot of people don't realize this, or at least, haven't thought of it in this way. Today, many business men are worried because whatever they have to sell is not in as great demand as before. Yet as a consumer, when someone tries to sell them something that they could really use to advantage, they tend to sit back and say, "Not now, let's wait and see." Then another business man is concerned about sales. Repeat this cycle often enough and things will really get bad. Many people tell our government to spend us back into peak production and employment and then follow a dollar-strangulation policy themselves. Why? Actually, it's more an attitude — and a dangerous one — than a necessity. There's still money around for constructive purposes. Now, we're not talking of major long-range capital investment or huge plant expansion. We're talking about the expenditures that you would have considered more-or-less routine in, say, 1956 or 1957. In fact with things tighter there's added incentive to spend now for those things that will improve your operation — an engine that runs better and cheaper, a tool that will cut job time, or to make those already-deferred repairs. What are you waiting for? An indication of the future? We've *got* to make it good, or admit that capitalism is a failure and start learning Russian. Or are you waiting for lower prices? If so, buying resistance as a consumer may lower the general price level a little. But as a producer, you'll be getting less for your product too. So where's the gain. Now, no one's going to quarrel with good business prudence. However, this doesn't mean stashing your money behind the brick in chimney. If you and enough others do this, as a consumer you'll be helping to put yourself out of business as a producer. So let's not "wait and see". Let's see if we can't do some "pump-priming" at the lower levels.

why "Precisioneered"

PEDRICK PISTON RING SETS

Improve Diesel and Gas Engine Performance!

PEDRICK Piston Ring Sets for diesel and gas engines are "precisioneered" to assure maximum power with minimum oil consumption, to most effectively seal against blow-by, to deliver the greatest number of hours of efficient performance at lowest operational and maintenance costs.

The rings in a PEDRICK "Precisioneered" Set are individually designed to assure users coordinated *team* action. The assembled set is tailor-made for *unitized* action in the specific engine.

That's why PEDRICK Engineered Sets are used as original equipment in practically all leading heavy-duty diesel and gas engines . . . and why when replacement rings are installed, PEDRICK Engineered Sets are specified by most maintenance men.

Complete Sets . . . or open-stock rings, you get improved performance, more economical operation when you specify PEDRICK Piston Rings. And remember, if you have any kind of a ring problem, you can count on us to help you solve it. Write, wire or phone: WILKENING MANUFACTURING COMPANY, Philadelphia 42, Pa. SAratoga 9-3770. In Canada: Wilkening Manufacturing Co. (Canada) Ltd., Toronto 2.

Pedrick **PISTON RINGS**

PEDRICK PIONEERED Conformable RINGS FOR BIG BORE ENGINES

highlights

Boston & Main RR operation cost $2-million less in 1957 than in 1952 even though same passenger-train miles business was done and fuel costs, wages and other expenses were higher. Saving was accomplished mostly by use of 105 Budd self-propelled diesel cars.

Two small gas turbine engines on tests have completed 2500 hours without replacing a basic component. They are similar to models used to propel small boats, helicopters and trucks. At the end of the test, both compressor turbines were considered to be in operable condition, although one power turbine wheel had developed a serious crack.

Allis-Chalmers reports gearing for expected business upturn later this year. Action is based on evidence such as: (1) farm equipment sales are ahead of 1957; (2) backlog of electrical generating equipment runs into 1960 and orders for transmission and distribution equipment to go with it are expected; (3) greater outlays for highway, public works and housing construction will increase demand for construction machinery.

Oops—the adding machine slipped. Here's a correction on the figures given in a "Highlight" item appearing in the February issue of Diesel Power. Receipts from special Federal petroleum taxes on diesel oil show the effect of greater usage and higher taxes. Treasury Department, Internal Revenue Service, figures for 1956 show total receipts of $28,890,000. January to September figures alone for 1957 total $34,338,000. At this rate totals for the full year, when available, should be somewhere near $39-million. Some jump in one year.

Combating corrosion by use of additives is making new strides. At a recent Gas Turbine Conference sponsored by the ASME, several ways of reducing corrosion in gas turbines by use of additives were discussed. Some additives being added to residual fuel include micronized talc, magnesium oxide or potassium permanganate. Lab tests showed this can be done for less than one cent to about 11 cents per barrel of oil. Synthetic sea water and other materials containing sodium or potassium also reduced corrosion.

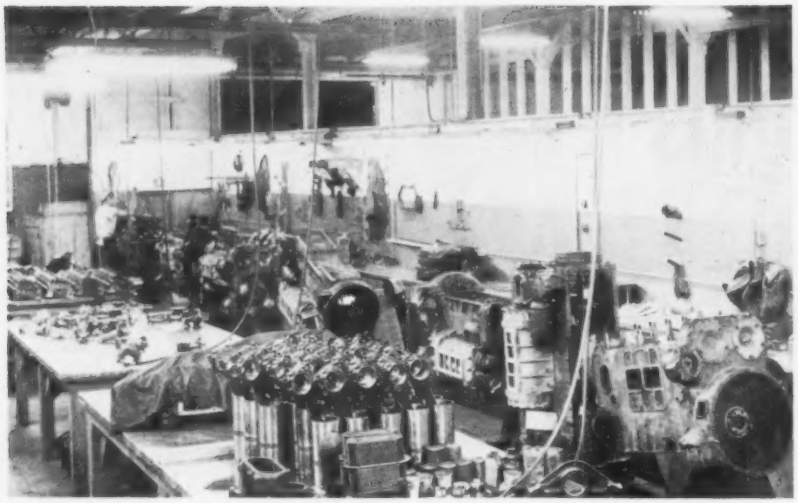
By field turbocharging, Permian Basin Pipeline Co. plans to boost output of six of 12 engines at Andrews County, Tex., natural gas pumping station. An increase of 4050 hp among the six engines will raise total station horsepower to 20,250.

Something new in contest prizes — diesels. Four Perkins diesel engines will be awarded by F. Perkins, Ltd. to the four contestants who, in the opinion of independent judges, submit the best slogan for Perkins diesels used in vehicle, industrial, agricultural and marine applications. Entrants are asked to supply other information which will be of assistance to the company.

More remote-controlled unattended "packages" are pumping Middle East oil to Mediterranean ports. Many are lightweight compact gas turbine units which can be easily moved into position. They are mounted on vans, driven to desert locations and fueled by crude oil tapped from the pipeline. Expensive build-up of communities at pumping stations is eliminated thus permitting use of more, less-costly remote-controlled stations, increasing oil flow through a given pipeline.

Turbochargers bring their own problems and field education is one of the most effective ways to combat them. Being aware of this, Clark Bros. are holding turbocharger seminars. The latest was held at their Olean, N. Y. plant, March 20-24. One representative from a company is permitted to attend, no more than 15 men in the entire group. Turbochargers, compressors and engines are covered.

Proposed bill in Congress is intended to speed up the national highway program. Favorably reported out of committee are two major provisions: $900-million for primary, secondary, and urban systems for each of fiscal years 1960 and 1961 and an additional $400-million for 1959. Money authorized for 1959 must be under contract by December 1, 1958 and construction completed by December 1, 1959. Money is to be available on 70% Federal—30% State matching basis. There's plenty of slack to implement this speeded-up program. Equipment makers are reportedly working at only 60% capacity and highway contractors at only 44% capacity.



In engine rebuilding shop, clean parts are being assembled on the engines. Use of engine stands, seen lined up at the right, make assembly very convenient for personnel, speed up production and increase work accuracy.

What Sells Engines?

What are the most important factors involved in engine sales? Price? Quality of product? Customer service? Or perhaps a combination of these and other considerations. There's one way to find out—ask successful distributors. This DIESEL POWER interview gives the answers supplied by the "World's Largest Distributor of Diesel Engines".

YOU expect things to be big in Texas. And you're not disappointed when you dig into the functioning of Stewart & Stevenson Services. Their operation is big and their thinking is big. This is not the ". . . chicken or the egg" routine; the thinking — sound and imaginative — came first. They were not always big but today they are the largest of the GM (Detroit Diesel Engine Division) distributors. In fact, they lay claim to being the largest diesel engine distributor in the world. They'll sell anywhere from 1500 to 2200 engines per year.

How come? Finding the answer was the objective of this interview. There had to be important ideas of value to others in the industry.

The place to start was at Stewart & Stevenson's main office and plant in Houston. The man to see was Joe Manning, vice-president and general manager. He rides herd on the whole operation. He was generous with his time and here's what developed.

"Joe, let's start with your thinking on how to sell engines."

"First of all, it's the distributor that sells engines. The factory knows how to build a fine product but it's the distributor that knows — or should know best — how to sell it. It takes more than getting a building, putting some engines on the floor, and waiting for the customer to come in.

"Sales will depend on 'what' the distributor sells (and I don't mean just the product) and 'how' he sells it. Let me elaborate.

"You have to sell more than just an engine. Included must be quick availability of parts and service and integrity of the organization to stand behind the product. That's the 'what' part. The 'how' part involves analyzing and finding out what the customer needs and then furnishing it to him the way he ought to have it. It might be supplying a special piece of auxiliary equipment or insuring that he gets the right engine, properly rated or applied for his particular job."

"Let's tie this to your operation. Start with service and parts."

"No, let's start with the engine. Operating as the Engine Division of the parent firm of C. Jim Stewart & Stevenson (Stewart & Stevenson Services is the name that was applied to the Engine Division in 1945), we installed some of the first Series 71 GM engines built by General Motors. And practically all of them are still running today, after nearly 20 years, and are making money for their owners. We've been selling them ever since and have actually seen so many examples of excellent performance and long life, that we are completely 'sold' on our own product.

"We want to keep our customers — or any other GM

engine owner, for that matter — sold on the product too. Nothing will 'unsell' the owner faster than unavailability of parts and service. We're jealous of our products' reputation and we protect it.

"Now, as to parts, we carry the largest distributor's stock of diesel power unit parts to be found anywhere — over $2-million worth. Quantities are kept at levels adequate to meet the requirements of all the engines in the area we serve. Plus what's here in the main plant, each of our branches and dealers maintain adequate stocks.

"Another customer convenience is our mobile parts warehouse. It's a sheet-metal, skid-mounted 'dog-house' mounted on a semi-trailer. When a number of engines are being operated in a remote area, we move it in along with a trailer house for as long as the need exists. One case was an irrigation project on an Indian reservation near the Mexican border; another was a boom in oil well drilling in New Mexico.

"Going a step further, we have parts and service salesmen operating out of Houston, Odessa and Dallas. In addition to bringing in business, they are good-will ambassadors. They visit customers to advise on what spare parts should be kept on the job and to see if there are any unusual parts or service problems. They visit both users and independent repair shops."

"You mean that you sell parts to, say, an independent engine rebuilding shop? At list, or what?"

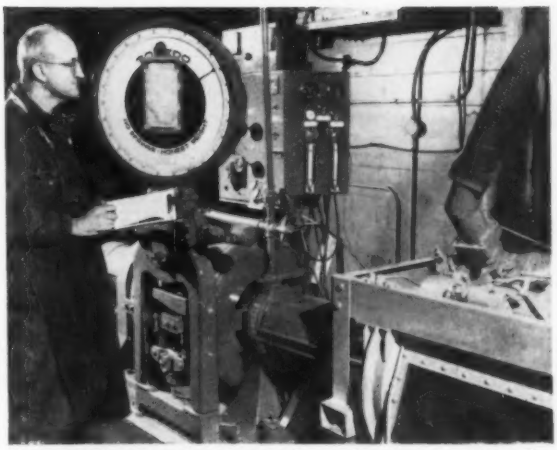
"Certainly, if they're a reputable and competent outfit. And they get a normal trade discount. It comes back to protecting the product's reputation. Let's not kid ourselves, these shops are doing work on Detroit Diesel engines and as long as they do a first class job at reasonable cost for our GM Diesel owners, then we actually want to help them.

"We can't stop the owner from taking his engine where he wants for repair and can't block the independent by not giving him parts at a reasonable price. He'll get the parts, factory-made or otherwise, so it's to our advantage — and everyone else's — to see that factory parts are used regardless of who does the repair work.

"I notice your slogan 'Service — anytime, anywhere'. How literally do you mean that?"

"You be the judge. Here, and in our six branches, we have parts and service personnel on duty 24 hours a day. Schedules are arranged on a shift basis. A special telephone directory is distributed to our customers. It lists every single employee with both business and home phone, plus telling his job.

"Our factory-franchised territory covers Texas and eastern New Mexico. We have branches at Corpus Christi, Dallas, Lubbock, San Juan, Odessa and Beaumont-Port Arthur. Then we have dealers in Brownsville, Aransas Pass, Galveston, San Antonio, Longview, Wichita Falls and Clovis, New Mexico. Plus this are representatives at San Antonio, Longview, Brownsville, Wichita Falls, Amarillo and Austin. Every person involved is on call at anytime to help someone out.



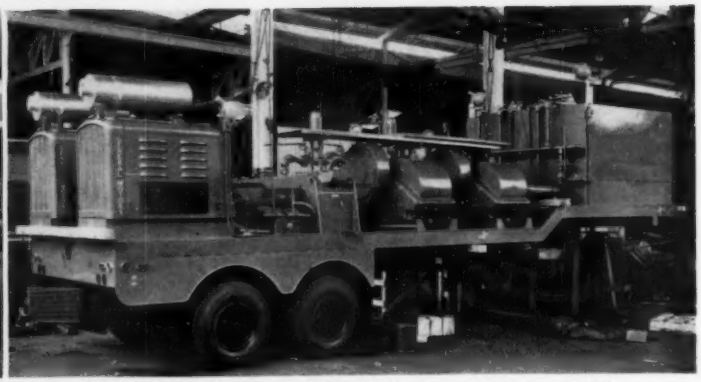
After rebuild, all engines are run-in on dynamometer before they are shipped to customer. This proves quality of work done on the units, guarantees customer satisfaction and insures fewer comebacks.

"We also manufacture a number of engine-driven units to meet special needs. These are sold all over the world. So we have an export office in New York. In many applications such as "Rigelectric", movement from one locality to another is not unusual. For example, a fleet of boats will move with the fish, drill rigs will shift to new locations, etc. We go where ever our units are and our service is needed. That, sometimes, is all over the world.

"For example, we recently sent a man to South America to help out a customer having trouble with the a.c. control equipment on some generator sets. Our man had the wiring straightened out in hardly more than 30 minutes. We have also sent men to Alaska, Europe, the South Pacific, and North Africa to visit installations of our equipment and assist our customers in any way. This is often at no charge to the customer."

All cylinder heads are hydrostatically tested for cracks before complete rebuild. Jig holding head on rear bench permits setting head in six positions for easy access. Valve gear in wire baskets was brought from cleaning room and is ready for assembly to head.

Full line of engine parts are available from stock and each is protected. All are arranged under major engine component headings and each bin is labeled.



Complete cementing rig, including trailer, is one of many special units engineered and built by Stewart & Stevenson. Two 4-cyl Series 71's are compounded to drive both or either of two pumps.

"We've been skirting service so far. Let's get specific on service now."

"Parts and service go hand in hand and engines are no better than the parts and service behind them. We've shown how we blanket our territory with both parts and service. For example, when our mobile parts warehouse goes out, a house trailer with skilled service personnel goes along.

"Each branch is set up to do major overhaul including complete engine rebuilding. At one time we did most of this work here (we still have complete facilities) but we decentralized this work for faster and more convenient customer service.

"Some special jobs are deliberately centralized. For example, we are doing all injector rebuilding at one place. High volume, lower labor costs and large stocks of used parts allow us to keep specialists busy reconditioning a maximum number of parts and thus keeping costs down. We're working toward complete cylinder head rebuilding on the same basis."

"You do a lot of manufacturing, don't you? How does this fit with your role of engine distributor?"

"Let's explain this as it applies to Stewart & Stevenson. The only reason we are in the manufacturing business is to sell more engines. Every product that we manufacture incorporates an engine or engines. It gets back to what we were talking about earlier. We find out what potential customers need and then build whatever they need into an engineered package with one responsibility and guarantee. This makes it easy for a customer to do business with us and — sells engines.

"Take our vertical pumping units, for example. We found that in the irrigation field, customers needed direct powering of the turbine pumps. We conceived the idea of setting the engine vertically on the pump with the crankshaft in line with the pump axis. This eliminates the complication and power loss of angle drives. No separate engine foundation or mounting is needed. You simply set the engine onto the pump and in a matter of minutes, with a few simple connections, the customer can start pumping.

"Despite misgivings in many places, we had very little trouble in modifying the engines to operate vertically. Modifications are minor, the real secret being in our patented thrust adapter. We build these units powered with the Series 71 and 110 engines and also with Chrysler V-8 engines. We've had many of our Verticals in operation for over 4 years now and there are hundreds of them in operation all over the world.

"Another example of how a need dictates what we do is seen in the Series 110 Quads. Our customers found a need for more power than is provided by the Series 71 Quads that Detroit Diesel has available. So we built the larger model 6-110 engines into a quad unit with ratings from 700 to 1200 hp, depending on the application. Some have been working well for two years on continuous 24 hour per day heavy-duty service.

"Other special units that we build are for different fields. For the oil fields these include high-pressure sand-fracturing equipment; oil well cementing units; a utility unit providing rig lighting, welder, air compressor and wash-down pump; as well as various generator sets, skid-mounted or mobile.

"Right now we are building a complete generating plant for a pipeline station involving two large natural gas engines. We're building the vertical-flow coolers, the switch gear, and all the systems.

"Lighting sets are a big business. Plus normal applications, we got into some special lines, carnival midway lighting for one. We have built everything from the mobile power vans to the aluminum lighting standards. We have also built studio vans for the movie industry. They use them for outdoor set lighting.

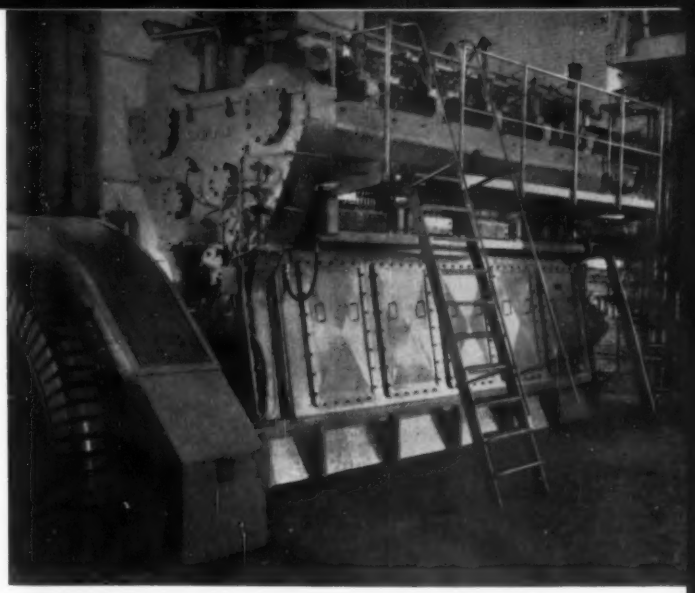
"Then there are the industrial applications and government work."

"Quite a diversification — oil field, marine, industrial, agricultural and military application."

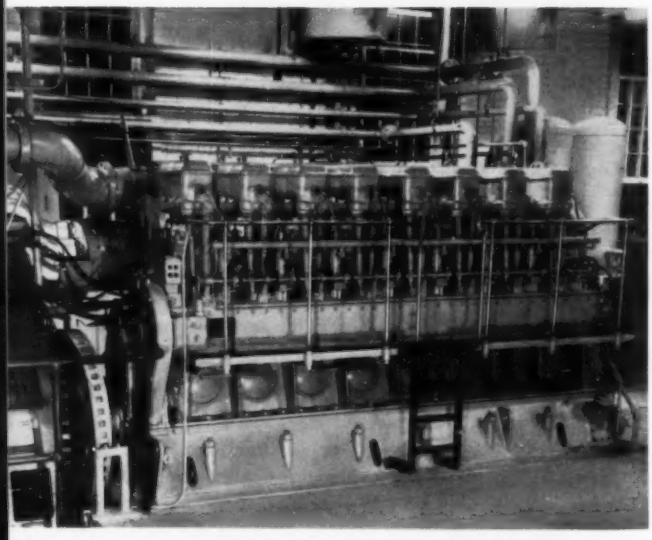
"Yes, and that is a point to stress. If you specialize in one field alone, you rise and fall with that field. By serving many fields you get many benefits of diversification without getting away from the primary business — sell-

(*Continued on Page* 32)

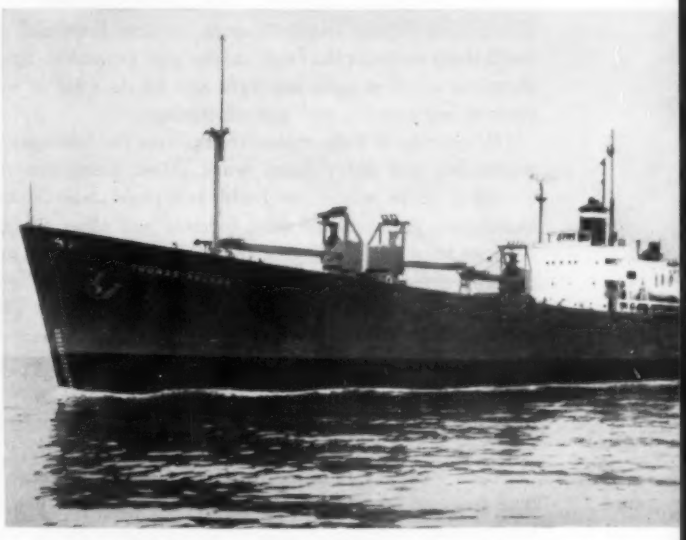
BALDWIN AND HAMILTON DIESELS CUT FUEL COSTS MORE THAN 50%



This Hamilton Model 521 SA saved the city of Edmundston, N. B., Canada, $44,000 in fuel costs alone during its first year of operation. And further economies will be effected which will cut power cost per kwhr to only 6.5 mills. This Hamilton Diesel will pay for itself in 6 short years because of its extraordinarily efficient operation.



A second Baldwin 600 Series engine has been installed in the Weatherly, Pa., power plant, due to the success of the first unit. Installed in 1951, this is producing at 60% less fuel cost than was possible with steam operation. We can show you how the efficient, latest design Baldwin and Hamilton diesels can cut *your* power generating cost too.



The converted Liberty ship "Thomas Nelson," pictured above, is equipped with two new Hamilton 7-cylinder diesels which are expected to save $180,000 in fuel costs alone! There are Baldwin and Hamilton stationary or marine diesels for virtually any installation in the 550 to 7200 hp range which can save you money in operating and maintenance costs.

For the latest in power, efficiency and trouble-free operation, industry, municipalities and marine operators turn to Baldwin-Lima-Hamilton for the best job at lowest cost. B-L-H Diesels are without doubt the soundest investment you can make. Write Dept. 18D today for detailed information.

Hamilton Division Hamilton, Ohio

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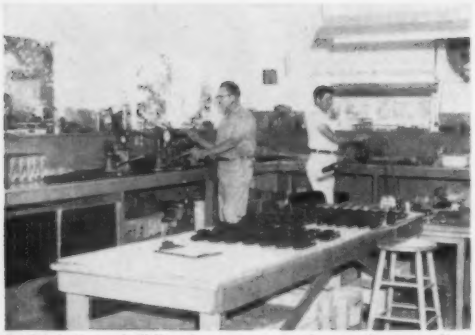
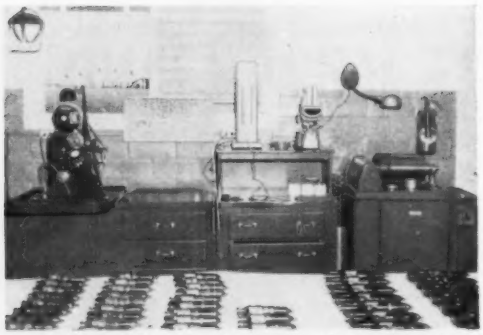
BALDWIN BLH LIMA-HAMILTON



Fuel injector rebuilding for own use and as exchange units is centralized at S&S's air-conditioned shop at San Juan, Texas. High-volume production lowers repair cost per unit.



Precision tooling, cleaning facilities, test equipment and large stock of used injectors permit high-volume production, maximum recovery of parts and savings to user.

(*Continued from Page* 30)

ing engines. We don't want to get too heavy in any one field. For example, we limit our military business to a maximum of 25%."

"What are you building for the military?"

"Principally, generator sets and ground support units of all types. A lot of these units now are 400-cycle generator sets. All the engineering is handled here and we build them up from the basic engine and generator. Specifications on these units are tight and we do a lot of specialized engineering and manufacturing.

"Of course, we have extensive facilities for fabrication, machining and sheet metal work. Then there are the electrical shops where we build our panel boards and switchgear, doing all the cable-forming and other wiring. Also we have had to get into many other things with our government work.

"Take low-temperature starting for example. We pioneered the use of warm air, circulated through the engine base, battery box, etc., as a means for sub-zero starting our diesel units. To test our engineers' work and later to meet specification tests, a cold room was needed. We have one that will pull temperatures down to minus —80°F.

"Then you get into frequency control and recovery time from no-load to full-load and back again. It has to be good on these 400-cycle units and we have found that a load-sensing governor is the best way to do it. We designed and built one of our own at considerable less cost than most commercial units.

"Costs are important in selling engines. When you can buy something for less than you can build it, then buy it. But in our case where we have the facilities, we can often build something, say the generator control panel, for less than we can buy it elsewhere. This price edge can mean the difference between a sale or no sale. This is particularly true in competitive bidding on large production contracts."

"You must have quite an engineering staff."

"Yes, we do, and it pays off in many ways. Actually, anyone selling engines must have some sound engineering talent available. For example, a good engineering analysis of an installation will save you and your customers all kinds of headaches and protect the product's reputation.

"Take the matter of horsepower rating. The way you rate an engine for a given application will often determine how satisfactory the service will be. Where we can rate and apply it properly for the job and see that it's installed right, we'll give the particular customer a flat-fee contract for maintenance over an extended period.

"Our staff enables us to get into various projects, all resulting in engine sales. Plus the ones that we've covered, we build semi-trailers to mount special diesel equipment and even complete special trucks for oil field use.

"We've also gotten into truck repowering and conversion work on a selective basis. It gets back to the matter of rating and application. We have to be very sure that the engine and driveline components will provide the required performance in the particular service intended, otherwise we are not interested."

"Joe, let me see if I can sum up the most important points that produce engine sales.

1. First, it's the distributor who must provide the means to sell the engines. He must sell more than just the engine product because, in your words, 'Engines are no better than the parts and service behind them.' In short, real service to the customer to help keep his *overall* cost of ownership low is one key to sales.

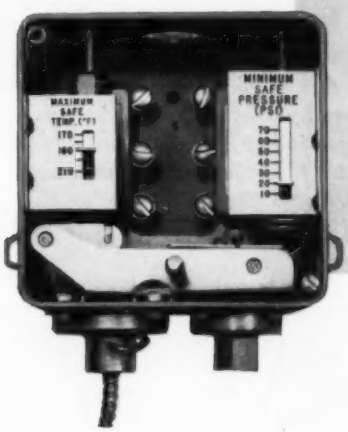
2. Next, the distributor must understand the customer's needs and supply them properly. This can apply in different ways from proper engine rating to meet the specific requirement, to building a special unit to do the job better and/or for less cost. To do this, he must know his area, the industries in it and their power problems. Then he must do something about it, based on the knowledge of his product, sound engineering principles and, where necessary, have manufacturing and fabrication facilities to produce a needed item.

3. Further, he should serve as many fields as he can. Diversification can stabilize his year-to-year business.

"I believe that those are the major points discussed but I'd like to throw in one more that you perhaps were too modest to mention — hard work. Does that sum it up?"

"That's about it."

Temperature and pressure set points are inside the case, protected against accidental manipulation. Cover is removed for easy adjustment.



New Diesel engine safety switch

...gives fail-safe protection

This all-new Honeywell safety switch responds to abnormal pressure or temperature to stop or idle a diesel engine, or actuate an alarm circuit.

It combines separate systems for measuring engine coolant temperature and lubricating oil pressure. The temperature system includes an exclusive fail-safe feature, so that in case of damage to its temperature bulb, capillary or diaphragm, the switch responds as it would to excessive temperature.

Temperature and pressure settings can't drift off set points. There can be no false shutdowns due to vibration. Set points are easily adjustable in the field.

Your nearby Honeywell sales engineer will be glad to give you complete information about the new Diesel Engine Safety Switch. Call him today . . . he's near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pennsylvania.

● **REFERENCE DATA: Write for Specification sheet S1010-5 "Diesel Engine Safety Switch."**

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First in Controls

The Most Advanced Power Package You Can Buy...

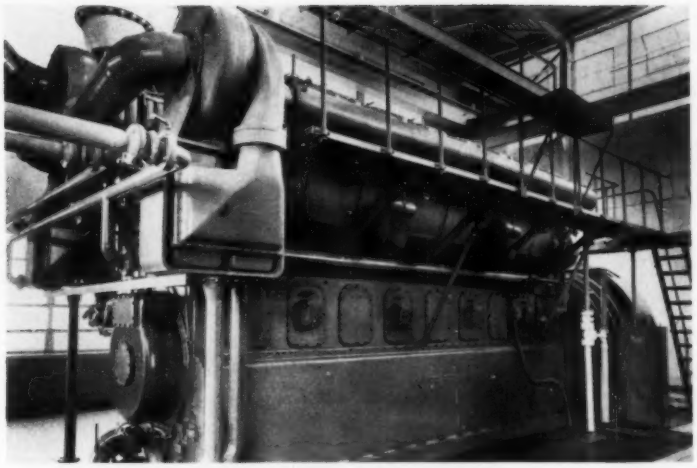
MERCEDES-BENZ
DIESEL ENGINES

When it comes to filling the power requirements for the Petroleum industry — whether it be for pumping, drilling, electrical generating or other specialized applications — the Mercedes-Benz is ready to provide you with quick, dependable power at the flick of your finger. Unusually long engine life and continuous operation under extreme climatic conditions are made possible by their exclusive, ultra-modern design. Indeed, the Mercedes-Benz is the most advanced power package available today!

MODEL MB 837 Aa
565 h.p. at 2200 r.p.m.

Other Mercedes-Benz diesels available in 12 and 20 cylinders, Turbo and Supercharged, up to 3000 h.p.

UTICA DIVISION
CURTISS-WRIGHT
CORPORATION • UTICA, MICHIGAN

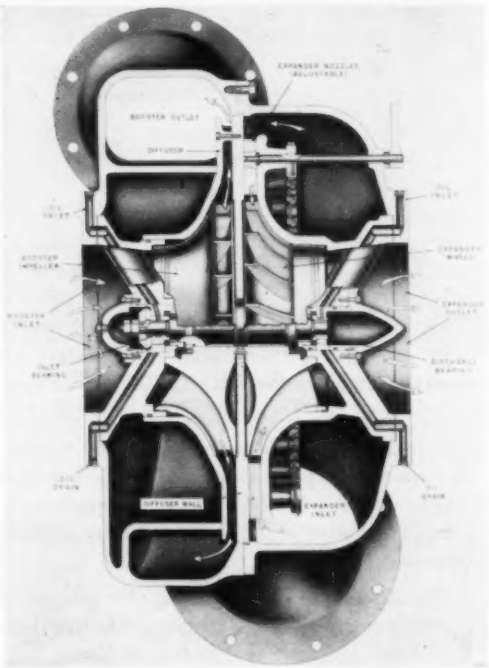


Cooper-Bessemer Type LSV-16 turbocharged spark-ignited gas engine is equipped with turbocooler (upper left) for cooling intake air. Engine rating is 4380 hp.

Turbocooling of Intake Air Proves Effective

Field operating records show Cooper-Bessemer's turbocooling system has boosted gas and gas-diesel engine output as much as 23% with 5% cut in fuel consumption. There are other benefits too.

Radial inflow turbine expander wheel (right) and centrifugal compressor impeller (left) are on a common shaft. Turbine drives compressor. Note adjustable expander nozzles.



TURBOCOOLING is a new method of cooling supercharging air. It is a practical way of cooling intake air to 60°F without the need for a source of very cold water. This new development by Cooper-Bessemer has boosted their gas and gas-diesel engine output as much as 23%. There are other benefits too.

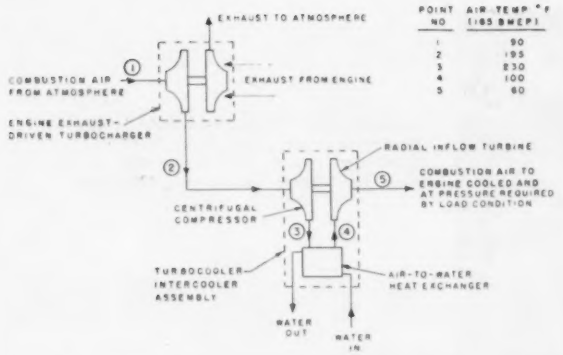
The cool, dense air obtained in the cylinder through this method does more than burn additional fuel with a corresponding increase in engine horsepower. Fuel is burned more completely, reducing fuel consumption as much as 5%. Plus the increased engine output and saving in fuel costs, the engine has a higher overload capacity with less danger of detonation. These, plus the many other obvious benefits of more complete combustion make this system very desirable.

Field operating records show that this system (covered in Diesel Power, April, 1957) is effective. These records have now proven the claims made when the system was first introduced. Over 150 C-B 4-cycle supercharged and turbocooled gas and gas-diesel engines already in operation testify to this. It is not applied to diesels. Some turbocooling units were used on new engines. However, many were installed as complete kits on existing engines in the field. The first turbocoolers placed in service in January 1955, are still providing fuel economies as low as 6010 Btu per bhph.

Turbocooler Design and Operation

The turbocooler is actually a bootstrap device. It is a package consisting of a radial inflow turbine and centrifugal compressor on a common shaft and an air-to-water heat exchanger. The turbine drives the compressor.

Filtered air enters the engine turbocharger (see diagram) at point (1) at say 90°F. Pressurized air from this turbocharger is at 196°F at point (2) as it enters



Cooling cycle of Cooper-Bessemer turbocooler. Figures at upper right give intake air temperature at various points in the system.

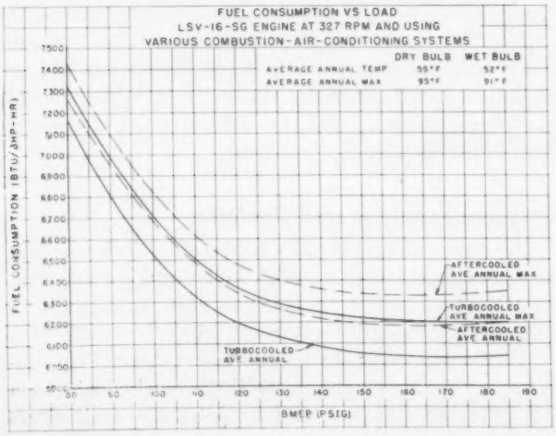
the centrifugal compressor of the turbocooler for a second stage of compression. Air leaving the second stage of compression, point (3), is at a higher pressure and at a 230°F temperature. Effective cooling takes place in the heat exchanger due to the large differential between the air temperature and commonly available cooling water. Air temperature at point (4) is now 100°F.

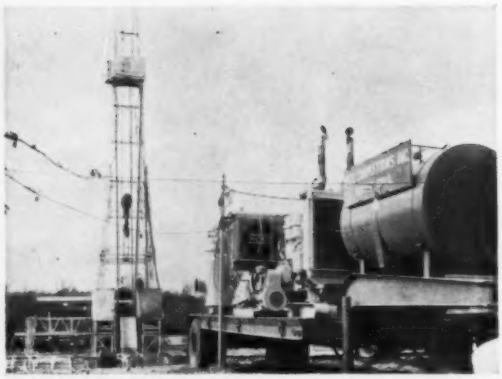
After cooling, the twice-compressed air is still at a pressure higher than required for effective turbocharging. This air enters the expander impeller of the turbocooler, and in the process of expanding through it gives up some of its energy to turn the expander wheel and provide power for the second stage of compression. During this expansion, the air is also cooled. It is now at the desired turbocharging pressure and at a 60°F temperature, point (5).

Summary

Turbocooling is an effective method of providing cool dense air for combustion. The result is greater potential for burning more fuel for additional horsepower and burning fuel more completely for higher thermal efficiency.

Curves show improvement in fuel consumption with cooler, denser air obtained through turbocooling as compared to that obtained when cooling with aftercooler in conventional turbocharging system.





Air Drill Rig Cuts Oil Well Drilling Time

AIR-drilling on a wildcat venture showed that it can cut operating costs and boost penetration rate. This was demonstrated recently on a high-speed drill rig working on an oil well, in Atoka County, Okla.

The new technique, using compressed air rather than mud as the circulating agent, pushed a 13,000 ft discovery well to a depth of 7000-ft in 20 days. Compressed air was piped into the rig's circulation system in the same way as drilling mud. It enters through the Kelly connection and passes down the drill stem to the drilling point below. It comes out around the bit, then returns up the outer casing wall to the surface, dissipating frictional heat and carrying drill cuttings to an exhaust outlet near the rig.

Air equipment for this job included four Joy air compressors. The compressors were vee-type twin units with a first-stage bore of 13½-in. and a second stage bore of 7-in. Each compressor unit, powered by a 6-71 General Motors twin diesel, delivered up to 820 cfm at 3000 psi maximum pressure. Each air plant was trailer-mounted and equipped with special heat exchangers and moisture separators to condition the air.

Air from the compressors entered a common manifold from which it was conducted to the rig through a 4-in. pipe. The single supply-line system simplified the job of joining the compressors in parallel operation as the need for greater air volume increased.

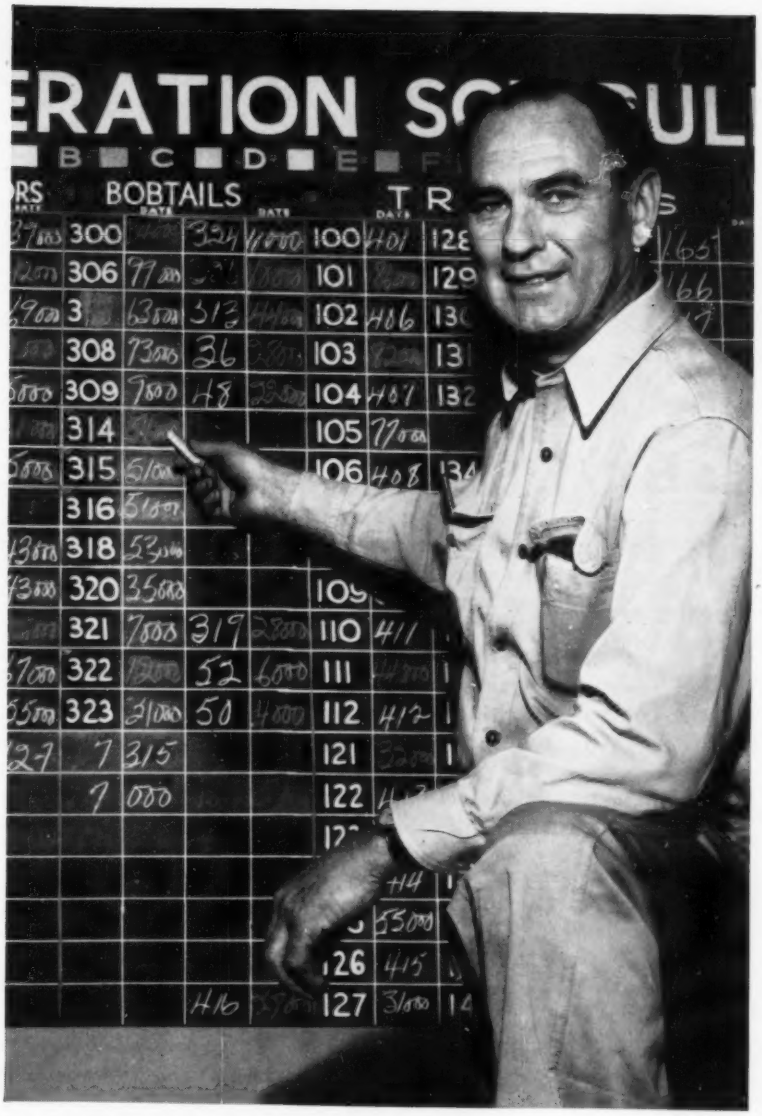
The advantages of air drilling plus new and improved equipment are expanding the number of wells air-drilled each year in this country.

ENGINEER'S FIELD REPORT

PRODUCT **RPM DELO Oil**

FIRM **STERLING TRANSIT CO.**
Montebello, California

350,000 miles on RPM DELO before rebuilding



Using RPM DELO Oil, Sterling Transit Co.'s 15 diesel tractors run an average of 250,000 miles before overhaul. "In fact, we get 350,000 to 400,000 miles out of them before engines are removed for rebuilding," reports Maintenance Manager Bill Schuster (above). "Regular oil changes are an important part of our preventive maintenance program. This color-coded chart indicates the mileage and condition of any unit in our 82-truck fleet...and these records show that RPM DELO Oil is doing a good job."

800-mile round trip between Oakland and Los Angeles is regular run for firm's big Kenworths and Internationals. Mr. Schuster makes frequent dipstick checks (above), reports make-up RPM DELO Oil for trip averages only 5 quarts. Older trucks use cleanable filters; newer units, replaceable cartridges. All use RPM DELO Oil exclusively.

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming.

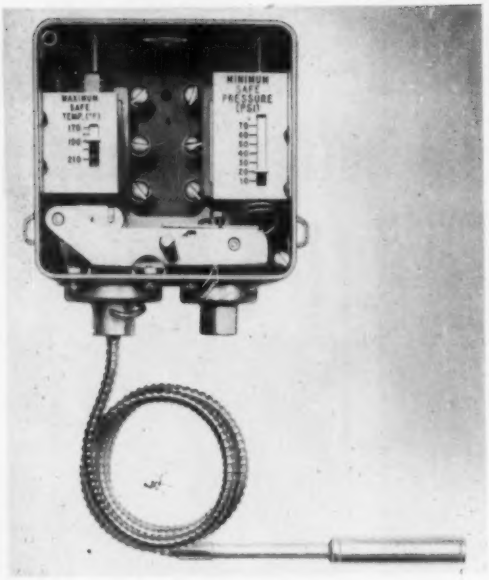
For More Information or the name of your nearest distributor, write or call any of the companies listed.

LUBRICATING OILS RPM DELO

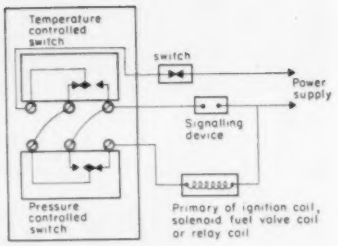
TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado



Protected temperature and pressure scale plates are readily accessible by removing front of case. Settings are field adjustable. Temperature-sensitive system has fail-safe feature.



Typical wiring hook-up of temperature- and pressure-sensitive systems. Other hook-ups can be arranged by changing connections at the binding posts.

Catch Engine Trouble Early

When lube oil pressure starts dropping or water temperature climbing—look out. You can't watch the gauges every minute—so let an automatic device do it for you.

AN engine protective device's first requirement is that it does its job. After this it should satisfy at least three other requirements. It should be simple so that very few parts are subject to wear and possible malfunction. It should be small and compact for ease of mounting. And it should have fail-safe features to prevent engine damage in case the device itself fails. These three requirements, plus others, are featured in Minneapolis-Honeywell's diesel engine safety cutoff.

This device made by Minneapolis-Honeywell Regulator Co., responds to both excessive water temperature and/or low lube oil pressure to stop or idle the engine and/or actuate an alarm. Both the temperature- and pressure-sensitive systems, though separate, are mounted on a common frame and compactly enclosed in the same metal case. This case is 5⅛-in. high, 4¼-in. wide and 3¾-in. deep.

Both systems are simple. The temperature-sensitive system consists of a remote bulb, a spring-loaded diaphragm and connecting capillary tubing. The gas in this system is at less then atmospheric pressure. When temperature of the engine coolant rises, expansion of this gas causes the diaphragm to activate an independent Micro-Switch precision switch which in turn actuates the final control element or alarm circuit.

In the pressure system, a stainless steel diaphragm is sensitive to engine lube oil pressure which acts directly on it. This diaphragm acts on another Micro-Switch switch which duplicates the action of the one just mentioned. Both of these switches operate on 6- or 12-v d-c power or 115- or 230-v a-c power. They are of the single-pole, double-throw type permitting flexibility of hookup. Wiring can be arranged to permit tailoring of the actuating circuit to fit the required needs.

Two systems with different temperature ranges are available. One has a range from 165°F — 215°F with a scale marked 170, 190, and 210. The other has a range of 205°F — 250°F with a scale marked 210, 230 and 250. The desired temperature setting at which the switch will work can be made easily in the field. Both the adjustments and the graduated scale plates are inside the case for protection against tampering. Just remove the cover plate to get at them. Once set, the temperature setting cannot drift regardless of vibration. This prevents any false shutdowns.

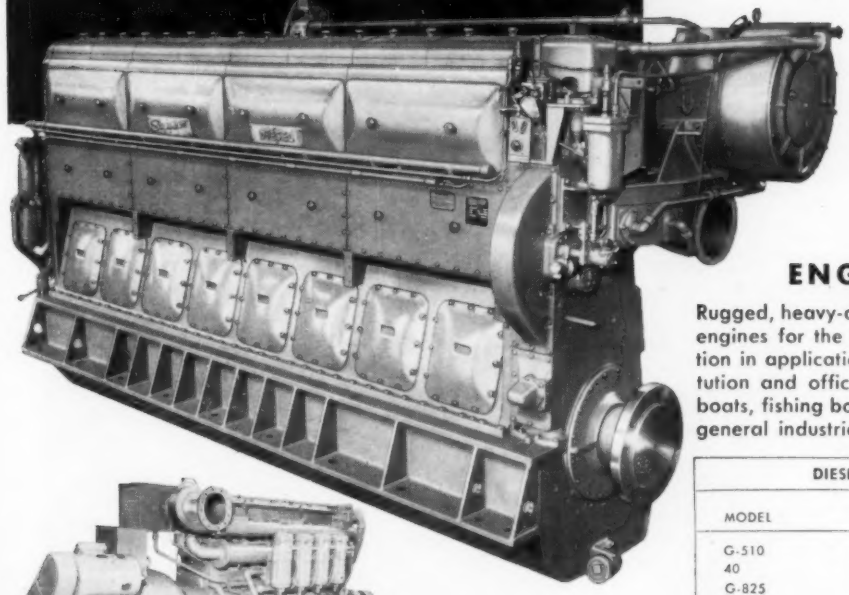
The temperature-sensitive system operates below atmospheric pressure with the spring-loaded diaphragm under continuous tension. If a leak or break should occur in the bulb, tube, or diaphragm, pressure of the inrushing atmosphere moves the diaphragm and makes the switch close the circuit. In other words, the device responds as it would to excessive temperature thus stopping the engine or sounding the alarm. This fail-safe feature prevents the engine from operating without the protection of the safety device.

The pressure-sensitive system of the device has a range of 5 to 75 psi. Its scale is marked 10, 20, 30, 40, 50, 60, and 70 psi. This scale plate and the adjustment for setting the minimum pressure at which the device will operate are alongside those of the temperature-sensitive system. An external manually-operated knob with an arrow on it can be set to one of three positions, start, run or stop. In the "start" position it permits starting of the engine even though no lube oil pressure exists. It automatically returns to "run" position after the engine is running and lube oil reaches operating pressure.

White SUPERIOR and ATLAS ENGINES

DIESEL • DUAL FUEL • GAS 100 to 2150 H.P.

for INDUSTRIAL, MARINE and OIL FIELD SERVICE

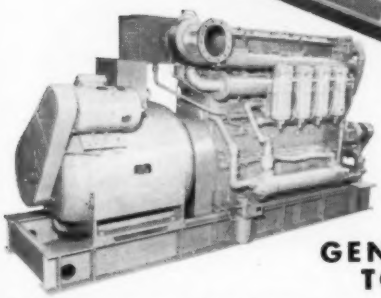


ENGINE POWER UNITS

Rugged, heavy-duty, high-quality, 6 and 8 cylinder, 4-cycle engines for the most dependable and economical operation in applications such as: municipal, public utility, institution and office building power plants; oil fields, work boats, fishing boats, dredges, quarries, power shovels and general industrial service.

DIESEL, DUAL FUEL and GAS ENGINES			
MODEL	FUEL	CONTINUOUS H.P. RANGE	CONTINUOUS R.P.M. RANGE
G-510	G	190- 400	600-1200
40	D, DF	215-1025	600-1100
G-825	G	300- 705	600- 900
60	D, DF	410-1325	400- 514
65	D, DF	580-2150	500- 600
80	D, DF, G	600-2000	300- 375

D—Diesel; DF—Dual Fuel; G—Gas



GENERATOR SETS TO 1500 KW

Standard or custom-built electric generator sets for your application. Diesel, dual fuel or gas engines. 150 to 1500 KW.

STANDARD A.C. GENERATOR SETS • DIESEL or DUAL FUEL ENGINES						
MODEL	RPM	BHP	KW	ENGINE HEIGHT	APPROXIMATE DIMENSIONS ENGINE WIDTH	ENGINE & GENERATOR LENGTH
40-S-6	600	225	150	69 1/8"	47 3/4"	171 3/4"
40-S-6	720	290	200	69 1/8"	47 3/4"	171 3/4"
40-S-6	900	360	250	69 1/8"	47 3/4"	171 3/4"
40-SX-6	900	430	300	71 1/2"	47 3/4"	174 3/8"
40-SX-6	900	505	350	71 1/2"	47 3/4"	177 7/8"
STANDARD A.C. GENERATOR SETS • NATURAL GAS ENGINES						
6G-510	720	225	150	65 5/8"	45 5/16"	149 1/2"
6G-510	900	325	200	65 5/8"	45 5/16"	155"
6G-825	720	375	250	70"	61"	171 3/4"
6G-825	900	450	300	70"	61"	171 3/4"

Standard generator voltage may be 120/208, 127/220, 240, 480 or 600. **Custom-built sets 150 to 1500 KW.**

MOBILE ELECTRIC GENERATING PLANTS

Completely self-contained powerhouse on wheels. 350 KW, 500 KW, 1000 KW and 1250 KW for base power, emergency or supplementary power wherever needed.

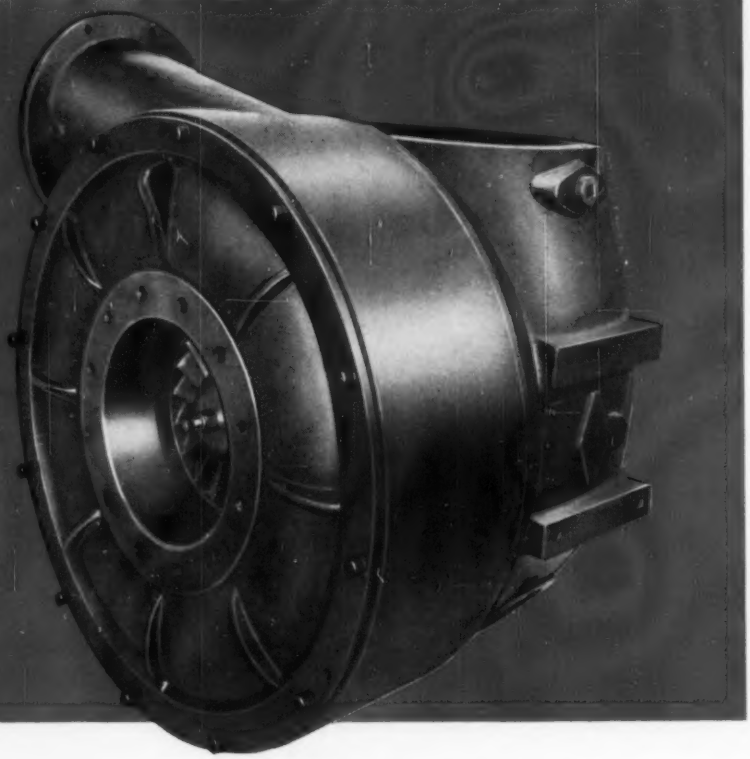
CALL, WIRE OR WRITE FOR COMPLETE INFORMATION

Superior ENGINES · ATLAS Imperial DIESEL ENGINES · White DIESEL

WHITE DIESEL ENGINE DIVISION
THE WHITE MOTOR COMPANY
Plant and General Offices: 1403 Sheridan, Springfield 99, Ohio
Phone: FAIRFAX 3-4921
EXPORT OFFICES: 415 Madison Avenue, New York 17, N. Y. Cable: Superdiesl

ELLIOTT TURBOCHARGERS

also serve 2-cycle engines



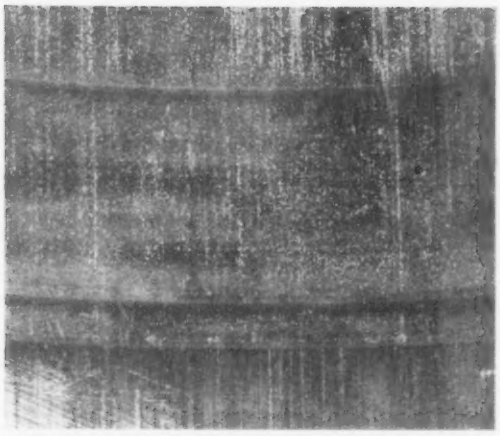
Elliott has 18 years of *unmatched turbocharger background.*

This successful, simplified precision rotor—the only moving part—stands up to high operating speeds and extreme temperature variations.

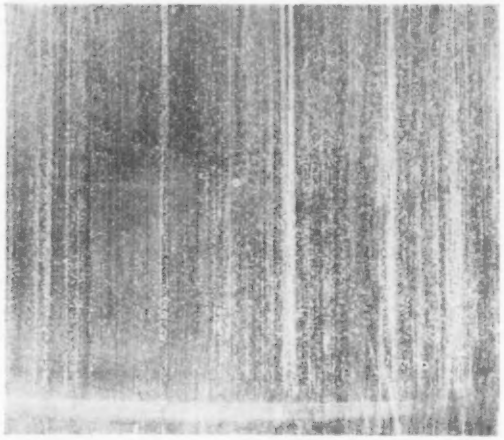
No other manufacturer in the United States has so much experience in building turbochargers. Elliott covers the whole field of turbocharged engines.

ELLIOTT Company
Turbocharger Department
Jeannette, Pennsylvania

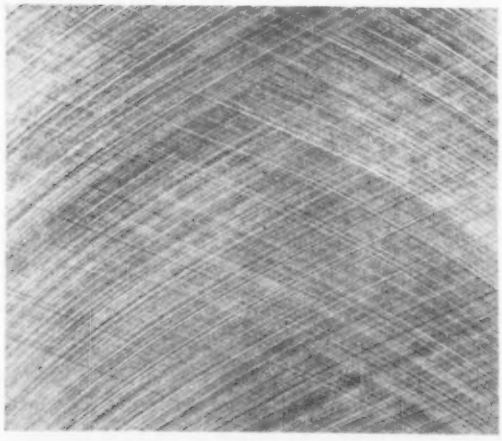
M8-1



Wavy liner is indicated by series of parallel lines or rings around the liner, generally at top or bottom of ring travel.



Scuffed liner has many small discolored areas that look like spots or vertical lines. Colors are light straw to dark blue.



Proper liner pattern is obtained by oscillating and moving hone up and down so crosshatch intersects at about 60 deg.

Prepare Liners- Then Install Rings

Successful re-ringing depends on proper liner preparation. Here are Perfect Circle's recommendations on liner preparation. Though specific to their rings, the principles apply in all cases.

A RE-RING job is only as good as your preparation of the worn liner. No matter how well you prepare rings, you must have a good liner surface or the rings won't do the job they're supposed to do — and they won't last. A good liner finish does three important things. It gives fast ring seating. It prevents ring and liner wall scuffing. Ring and liner wear are cut to a minimum. Perfect Circle Corp. engineers have definite ideas and specific recommendations on how to prepare a worn liner and get this proper finish.

Preparing Worn Liners

During engine operation, a glaze forms on liner walls. It is caused by products of combustion, lube oil and normal wear. This glaze is an excellent antiscuff material. With rings treated for rapid break-in it is not necessary to break this glaze on a liner. This does not mean that you can leave the wear ridge at the end of ring travel.

According to Perfect Circle engineers, their new rings will seat as quickly in glazed liners as they will in the same liners with the glaze removed — provided there's nothing wrong with the liner. When there is indication that the liner is wavy, out-or-round, or scuffed, the walls should be made straight and true by honing.

A wavy liner has a series of parallel lines or rings around the liner, generally at the top or bottom of ring travel. You can feel them by running a finger over the surface. This surface should be reconditioned with a flexible spring-loaded type hone.

In a scuffed liner, heat has been sufficient to cause localized welding and mechanical forces tear metal from the surface. A tiny recess is left on one part of the liner surface and metal is smeared on to another. The metal which pulls out and that in and around the recess hardens as a result of scuffing. If this isn't removed before in-

stalling rings, scuffing continues or these hard particles break loose and have to go somewhere. Both effectiveness and life of the rings are shortened considerably.

A scuffed liner has many small discolored areas that look like spots or vertical lines. These may be localized or run the length of the liner. Color varies from light straw to dark blue depending on temperature reached and how long the engine ran after scuffing started. Metal in the center of these areas is smeared along the line of piston travel. Even when depth of the scuff is minute it can be seen and the roughness felt.

Marks and deposits left by scuffing can be removed with various hones or glaze breakers. Some important points to keep in mind when selecting one of these tools are that: (1) it exerts enough pressure against liner wall to thoroughly interrupt the entire surface; (2) it is flexible enough to follow liner contour; (3) stones are of correct grit size to give proper finish; (4) stones are hard enough to give satisfactory life when used on hardened liners.

These hones will easily correct liner waviness and scuffing. But for correcting out-of-roundness or accurately oversizing a liner, more rigid hones with calibrated feeds should be used.

Liner finish specified by most engine builders is 15 to 30 microinches, preferably to the higher limit. The rougher surface has a higher load carrying capacity and is less likely to scuff during break-in. The larger depressions hold a better supply of lube oil. However, if the surface is too rough, rings wear at a high rate. If it is too smooth, ring seating will be slow. A desired finish is one that is a compromise between these two extremes.

There's no convenient way to check accurately liner finish produced in a shop. Equipment for measuring this finish is sensitive and expensive. It is generally found only in laboratories or large production shops. Therefore, technicians must rely on makers of honing equipment to supply them with proper tools and assume that the surface produced is within specified limits.

For a given grit size, the finish produced on a hardened liner of 350 Brinnel or over is slightly smother than that produced on a regular cast iron surface. Use of cutting oil also gives a smoother surface. All these factors — cylinder roughness, hardness and whether the hone is used wet or dry — must be taken into consideration when selecting stone grit size. But generally, 180 to 280 grit stones give a finish between 15 and 30 microinches. The smaller the grit number, the coarser the stone.

Most honing equipment makers recommend use of cutting oil or other liquid lubricant with their tools. Stones stay clean giving a more uniform finish. Amount of abrasives thrown into other sections of the engine are also reduced.

The following honing procedure recommended by Perfect Circle engineers has given very good results.

1. Remove carbon deposits from liner to prevent loading stones.

After washing cylinder walls of engine with light lube oil prior to installing piston rings, the walls are wiped off with a clean, dry white cloth. Appearance of white cloth is quick check for cleanliness. Though gasoline engine block is shown, the same cleaning procedure is used for liner walls of diesel engines.

2. Cover crankshaft with dry rags or dampened newspapers to prevent abrasives and dirt from getting on it.

3. Wet liner with cutting oil or other lubricant and insert hone.

4. Hone liner 10 to 15 strokes or until surface is well interrupted. Oscillate and move hone up and down to produce a pattern where a crosshatch intersects at about 60 degrees.

5. Clean loose abrasives from hone before using in next liner.

6. *Clean liners thoroughly.*

Cleaning Liners After Honing

Proper cleaning of liner bores prior to installing rings is essential. Warm water, soap and a brush is one of the best ways of doing this but it can be messy. A more practical way is to use light engine oil, a small string mop and clean rags. This is done as follows: (1) dip mop in SAE-10 or 10W oil; (2) swab liner thoroughly with mop; (3) wipe liner with dry clean white cloth. Repeat steps 2 and 3 until liners are clean. Appearance of the white cloth is a quick check for cleanliness.

Summary

Let's summarize briefly the major points in preparing a liner to receive a new set of Perfect Circle rings. First, break the glaze on worn liners only when necessary. A ridge at the end of ring travel, waviness, out-of-round, or a scuffed condition require correction. Next, a 15 to 30-microinch finish is recommended when reconditioning these liners. This is obtained with 180 to 280 grit stones. Then, before installing new rings, *clean liners thoroughly* with light oil and clean rags. If rings are to work properly and have a long trouble-free life, it is just as important to prepare the liners properly as to properly install the rings themselves.

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The modern Hercules lines of engines have advantages for everyone: to the equipment manufacturer, complete mounting interchangeability of DD and GO series engines in the same number of cylinders means that customers' engine preference can be met from 6 engines without design modification. To users of Hercules-powered equipment, an unusually high degree of parts interchangeability between all engines and rugged, dependable design reduce maintenance costs to a minimum. And, these new engines are backed by Hercules 43-year reputation for engine building know-how.

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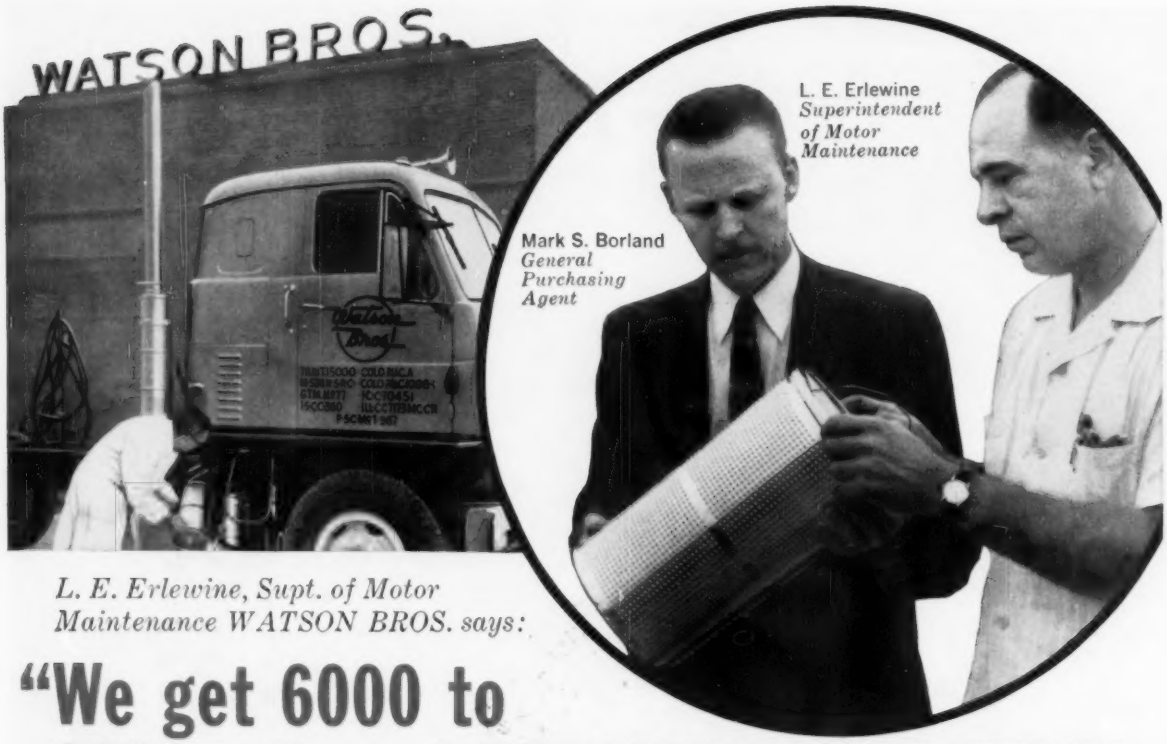
Other Hercules engines are available in from 4 to 500 horsepower. For full details and descriptive literature, write Hercules Motors Corp., Dept. 10D, Canton 2, Ohio. Or write the Hercules distributor-dealer near you in the world-wide Hercules sales and service network.

HERCULES

HERCULES MOTORS CORPORATION
Canton, Ohio



L. E. Erlewine, Supt. of Motor Maintenance WATSON BROS. says:

"We get 6000 to 8000 miles of EFFECTIVE FILTRATION from a single DIESELPAK"*

Here's powerful proof that superior performance COSTS LESS than ineffective substitutes

Only LUBER-FINER DIESELPAK, with its *exclusive* specially processed media, removes oil contaminants *effectively*—FAR LONGER THAN ANY SUBSTITUTE PACK.

DIESELPAK—designed expressly for use with H.D. detergent compounded oil—removes not only injurious suspended solids, but also colloidal impurities (often more destructive) *without affecting the additives.*

Thus LUBER-FINER DIESELPAK

1. COSTS LESS than ineffective substitutes because it gives MORE MILES of *effective filtration.*
2. Also ADDS THOUSANDS OF MILES to ENGINE AND OIL LIFE because its exclusive engineered protection CLEANS OIL FASTER AND KEEPS IT CLEAN LONGER.

STANDARD AND OPTIONAL EQUIPMENT—On leading Diesel Trucks, Tractors and Stationary Engines.

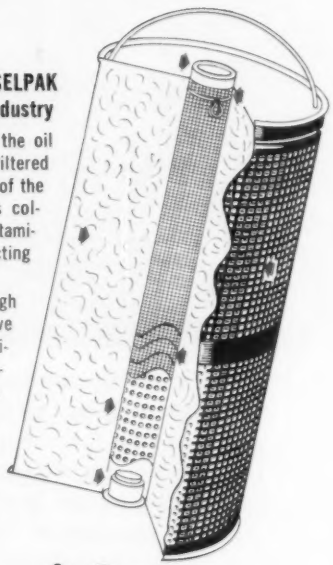
* A typical statement of many users, engineers, and original equipment manufacturers on file.

VISUAL PROOF why DIESELPAK is The Standard of the Industry

Positive end seals prevent the oil from by-passing. The oil is filtered through the patented media of the DIESELPAK which removes colloidal particles and other contaminants without adversely affecting the additives.

The oil then passes through several layers of protective fibrous material which is scientifically engineered to positively prevent media from migrating into the engine.

World renowned engineered protection is enjoyed only by the users of the genuine LUBER-FINER "DIESELPAK."



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WRITE FOR INFORMATION—how to get MORE MILES of effective lubrication at LESS COST. Dept. 42.

LUBER-FINER, INC.
2514 South Grand Avenue, Los Angeles 7, California

1958 ENGINE SPECIFICATIONS

Diesel • Dual-Fuel • Natural Gas

Data on Engines Manufactured by American Diesel Engine Builders

Alco Products, Inc. S-2
Allis-Chalmers, Engine-Material Handling Div. S-2
American M.A.R.C., Inc. S-2
Baldwin-Lima-Hamilton Corp. S-3
Caterpillar Tractor Co. S-3
Chicago Pneumatic Tool Co. S-3
Clark Brothers Co. S-4
Climax Engine & Pump Mfg. Co. S-4
Continental Motors Corp. S-4
Cooper-Bessemer Corp. S-5
Cummins Engine Co., Inc. S-5
Enterprise Engine & Machinery Co. S-6
Fairbanks, Morse & Co. S-6
Ford Motor Co., Ford Div. S-6
GM-Cleveland Diesel Div. S-7
GM-Detroit Diesel Engine Div. .. S-7
GM-Electro-Motive Div. S-7
Gray Marine Motor Co. S-7
Harnischefeger Corp. P&H Diesel Div. S-7
Hercules Motors Corp. S-7
Ingersoll-Rand Co. S-8
International Harvester Co. S-8
Kahlenberg Brothers Co. S-8
Kermath Diesel Div., Venn-Severin Engine Works, Inc. S-9
Lathrop Engine Div. Burmeister & Wain S-9
Le Roi Div.-Westinghouse S-9
Lufkin Foundry & Machine Co. ... S-9
Mack Trucks, Inc. S-9
Minneapolis-Moline Co. S-9
Murphy Diesel Co. S-9
Nordberg Mfg. Co. S-10
Oliver Corp. S-10
Rathbun-Jones Engineering Co. S-10
R. H. Sheppard Co., Inc. S-10
Sterling Engine Co. S-11
Union Diesel Engine Co. S-11
Waukesha Motor Co. S-11
White Diesel Engine Div., White Motor Co. S-12
White-Roth Machine Co. S-12
Witte Engine Works S-12
Worthington Corp. S-12

Foreign Diesel Engines Being Actively Sold in This Country

Armstrong Siddeley (Brockworth) Ltd. S-13
Burmeister and Wain American Corp. S-13
Curtiss-Wright Corporation S-13
The Daimler Corporation S-13
Gebr. Eicher Traktorenfabrik S-14
Henschel-Werke GmbH. S-14
Klockner-Humboldt-Deutz S-14
Lister-Blackstone, Inc. S-14
M.A.K. S-15
M.A.N. S-15
Napier Engines, Inc. S-16
F. Perkins (Canada) Ltd. S-16
Petter Engine Div. of Brush ABOE Inc. S-16
Sulzer Bros., Ltd. S-16

SYMBOL MEANINGS

Use

M—Marine propulsion service
S —Stationary service implying permanence of installation
P —Mobile, portable, or transportational service

Type

A —Diesel
B —Spark ignition natural gas engine
C—Diesel and dual-fuel
D —Diesel, dual-fuel, and natural gas engine

Starting System

A —Air starting
E —Electric starting
G—Gasoline engine starting
H—Hand cranking
HY—Hydrostarter

Fuel System

O—Own manufacture
B —American Bosch
S —Bendix-Scintilla
R—Roosa-Master
D —Demco
A —Adeco
C—CAV
G—Robert Bosch

Ignition

B —Battery system
LM—Low tension magneto
HM—High tension magneto
P —Pulse generator

Supercharging Systems

M—Mechanical
T —Turbocharger

Reverse Gears

D —Direct reversing
S —Snow-Nabstedt
T —Twin Disc
C —Capitol
W—Western Gear
P —Paragon
O—Own manufacture
F —Falk

Notes:
Model numbers are for basic engines and may vary for other ratings and uses.
Dimensions are given to the next largest inch.
Dimensions and weights are for basic model unless otherwise indicated.

Alco Products, Inc., 30 Church Street, New York, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
6-9 x 10½	C	M-S-P	4	6	9 x 10½	550-900	720-1000	B	....	E-A	T	W-F	136	60	98	22100
12-9 x 10½	C	M-S-P	4	12	9 x 10½	1100-1800	720-1000	B	....	E-A	T	DH-W**	158	61	110	32650
16-9 x 10½	C	M-S-P	4	16	9 x 10½	1470-2400	720-1000	B	....	E-A	T	DH-W**	197	61	104	42000
6-12½ x 13	C	S-P	4	6	12½ x 13	550-660	600-740	B	....	E-A	.	....	156	60	82	34000†
6-12½ x 13T	C	S-P	4	6	12½ x 13	810-1000	600-740	B	....	E-A	T	....	156	60	116	36000†
8-12½ x 13	C	S	4	8	12½ x 13	775-860	600-720	B	....	A	..	....	200	60	96	49000
8-12½ x 13T	C	S	4	8	12½ x 13	1080-1360	600-720	B	....	A	T	....	225	60	116	50000

*Maximum Continuous HP. †Dimensions and weight for portable unit. **DeLaval-Hindmarch/Western.

Allis-Chalmers Mfg. Co., Engine-Material Handling Division, Milwaukee 1, Wis.

Model†	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
2BD77	A	M-S-P	4	2	3⅞ x 4½	13.5	1800	B	....	E	....	S	22	23	31	500**
4DA153	A	M-S-P	4	4	3⅞ x 4½	29	2000	B	....	E	....	S	31	23	31	680**
6DA230	A	M-S-P	4	6	3⅞ x 4½	45	2000	B	....	E	....	S	39	23	31	850**
4DA182	A	M-S-P	4	4	3¾ x 4½	39	2000	B	....	E	....	S	31	23	31	710**
6DA273	A	M-S-P	4	6	3¾ x 4½	58	2000	B	....	E	....	S	39	23	31	890**
6DAM273	A	M	4	6	3¾ x 4½	85	2800	B	....	E	....	S	57	24	32	995
D344	A	S-P	4	4	4⅞ x 5⅝	72	1800	B	....	A-E	....	....	37	30	46	1565
D516	A	S-P	4	6	4⅞ x 5⅝	100	1800	B	....	A-E	....	....	48	30	48	1950
6DA779	A	S-P	4	6	5¼ x 6	142	1800	B	....	E	....	....	59	30	49	2552**
6DA844	A	M-S-P	4	6	5¼ x 6½	166	1800	B	....	E	....	S	59	30	49	2630**
6DAS844	A	M-S-P	4	6	5¼ x 6½	196	1800	B	....	E	M	S	59	35	49	2674**
8DA1125	A	M-S-P	4	8	5¼ x 6½	225	1800	B	....	E	....	S	76	30	51	3400**
8DAS1125	A	M-S-P	4	8	5¼ x 6½	242	1800	B	....	E	M	S	78	34	51	3580**
6DA970	A	S-P	4	6	5⅝ x 6½	198	1800	B	....	E	....	....	59	30	49	2600**
8DC1290	A	S-P	4	8	5⅝ x 6½	204	1800	B	....	E	....	....	76	30	51	3450**
6DCB1879	A	M-S-P	4	6	6¾ x 8¾	330	1200	B	....	A-E	....	S	96	54	65	6925**
6DCS1879	A	M-P	4	6	6¾ x 8¾	264	1200	B	....	A-E	M	S	100	54	65	7900**
8DC2505	A	M-S	4	8	6¾ x 8¾	306	1200	B	....	A-E	....	W	149	52	92	12840***
8DCS2505	A	M-S	4	8	6¾ x 8¾	400	1200	B	....	A-E	M	W	158	64	92	13240***
B125	B	S-P	4	4	3⅝ x 3½	29.5	1800	..	HM	E	....	....	44	16	31	550
4B153	B	S-P	4	4	3⅞ x 4½	37	2400	..	B-HM	E	....	....	51	23	39	780
4B182	B	S-P	4	4	3¾ x 4½	45	2400	..	B-HM	E	....	....	51	23	39	780
W226	B	S-P	4	4	4 x 4½	60	1800	..	HM	E	....	....	52	24	38	925
6B230	B	S-P	4	6	3⅞ x 4½	54.5	2000	..	B-HM	E	....	....	57	23	39	960
6B273	B	S-P	4	6	3¾ x 4½	64	2000	..	B-HM	E	....	....	57	23	39	960
HP326	B	S-P	4	6	3⅛ x 4¾	69	1800	..	B-HM	E	....	....	61	27	46	1164
HP351	B	S-P	4	6	3⅛ x 5⅛	67	2400	..	B-HM	E	....	....	61	27	46	1164
K428	B	S-P	4	6	4⅝ x 4¾	84	2400	..	B-HM	E	....	....	71	32	52	1810
L525	B	S-P	4	6	4½ x 5½	91	2400	..	B-HM	E	....	....	71	32	52	1860
LO525	B	S-P	4	6	4½ x 5½	110	2400	..	B-HM	E	....	....	73	30	53	2050
6MO893	B	S-P	4	6	5⅝ x 6	158	2000	..	B-HM	E-G	....	....	95	39	64	3815
6MO970	B	S-P	4	6	5⅝ x 6½	167	1950	..	B-HM	E-G	....	....	95	39	64	3830
8MO1290	B	S-P	4	8	5⅝ x 6½	214	1950	..	B-HM	E-G	....	....	111	46	74	5420
6PC1879	B	S-P	4	6	6¾ x 8¾	226	1200	..	B-HM	A-E-G	....	....	123	48	83	9100
8PC2505	B	S-P	4	8	6¾ x 8¾	290	1200	..	B-HM	A-E-G	....	....	141	64	93	12640
8PCS2505	B	S-P	4	8	6¾ x 8¾	572	1200	..	B-HM	A-E-G	M	....	150	64	88	14289

* Intermittent HP. ** Weights and dimensions for portable units. *** Weights and dimensions for stationary units. † All diesel engines have Lanova combustion system.

American M. A. R. C., Inc., 1601 W. Florence Avenue, Inglewood, California

Model†	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.††	Width In.††	Height In.††	Weight Lb.††
AC1	A	S	4	1	3½ x 3½	6	1800	B	....	H-E	....	....	27	15	24	220
AC2	A	S	4	2	3½ x 3½	13	1800	B	....	H-E	....	....	34	25	25	350
WC1	A	S	4	1	3½ x 3½	6	1800	B	....	H-E	....	....	27	15	24	205
WC2	A	M-S	4	2	3½ x 3½	14	1800	B	....	H-E	....	S	34	25	25	375

* Continuous HP. † Engines have pre-combustion chamber. †† Dimensions and weights are for basic engine.

Baldwin-Lima-Hamilton Corp., Hamilton, Ohio

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.††
606-NA	C	M-S	4	6	12¼ x 15½	430–750	360–625	B-S	....	A-E	....	D†	159	76	91	35000
608-NA	C	M-S	4	8	12¼ x 15½	575–1000	360–625	B-S	....	A-E	....	D†	195	76	91	43500
606-SC	C	M-S	4	6	12¼ x 15½	650–1320	360–625	B-S	....	A-E	T	D†	170	86	91	36500
608-SC	C	M-S	4	8	12¼ x 15½	865–1750	360–625	B-S	....	A-E	T	D†	212	89	91	45000
521-SA	A-C	M-S	2	5	21½ x 27½	2425–2800	257–277	B	....	A	....	D	267	80	161	175000
621-SA	A-C	M-S	2	6	21½ x 27½	2910–3360	257–277	B	....	A	....	D	304	80	161	205000
721-SA	A-C	M-S	2	7	21½ x 27½	3395–3920	257–277	B	....	A	....	D	341	80	161	233000
821-SA	A-C	M-S	2	8	21½ x 27½	3880–4480	257–277	B	....	A	....	D	378	80	161	262500
921-SA	A-C	M-S	2	9	21½ x 27½	4365–5040	257–277	B	....	A	....	D	415	80	161	292000
1021-SA	A-C	S	2	10	21½ x 27½	4850–5600	257–277	B	....	A	....	....	478	80	161	321000
1221-SA	A-C	S	2	12	21½ x 27½	5820–6720	257–277	B	....	A	....	....	552	80	161	380000

*Continuous HP † Straight Reduction Gear or Reverse Reduction Gear. †† Weights are net for engine only.

Caterpillar Tractor Company, Peoria, Illinois

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
D-311	A	S-P	4	4	4 x 5	43.5	1800	O	....	E-G	....	....	56	28	53	1800
D-315	A	M-S-P	4	4	4½ x 5½	62	1800	O	....	E-G	....	T	59	30	43	2200
D-315G	A	S-P	4	4	4½ x 5½	80	1800	O	....	E-A	T	T	47	36	56	1985
D-318	A	M-S-P	4	6	4½ x 5½	90	1800	O	....	E-G	....	T	77	31	53	2770
D-318G	A	S-P	4	6	4½ x 5½	120	1800	O	....	E-A	T	T	61	37	51	2450
D-326F	A	M-S-P	4	6	5⅛ x 6½	137	1800	O	....	A-E-G	....	T	72	37	59	3550
D-337F	A	M-S-P	4	6	5⅛ x 6½	186	1800	O	....	A-E-G	T	O	73	37	60	3700
D-339	A	M-S-P	4	4	5¾ x 8	100	1200	O	....	A-E-G	....	....	74	39	66	3800
D-342	A	M-S-P	4	6	5¾ x 8	152	1200	O	....	A-E-G	T	T	81	43	62	5140
D-353C	A	M-S-P	4	6	6¼ x 8	290	1200	O	....	A-E-G	T	T	76	48	69	6230
D-375D	A	M-S-P	4	V-8	5¾ x 8	325	1200	O	....	A-E-G	T	S-T	84	55	79	8650
D-375D	B	S	4	V-8	5¾ x 8	267	1200	O	LM	A-E-G	....	....	84	55	77	8150
D-397D	A	M-S-P	4	V-12	5¾ x 8	500	1200	O	....	A-E-G	T	S	107	58	79	11250
D-397D	B	S	4	V-12	5¾ x 8	400	1200	O	LM	A-E-G	....	....	101	58	79	10700

* Continuous HP.

Chicago Pneumatic Tool Company, 6 East 44th Street, New York 17, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight
39-CP	D	S-P	4	3	9 x 10½	145	720	S	LM	A	....	....	68	44	67	8900
49-CP	D	S-P	4	4	9 x 10½	195	720	S	LM	A	....	....	84	44	67	10690
69-CP	D	S-P	4	6	9 x 10½	290	720	S	LM	A	....	....	112	44	67	14240
89-CP	D	S-P	4	8	9 x 10½	385	720	S	LM	A	....	....	140	44	67	16750
412-CP	D	S	4	4	11 x 12	340	720	S	LM	A	....	....	106	47	95	21200
512-CP	D	S	4	5	11 x 12	425	720	S	LM	A	....	....	124	55	95	25300
612-CP	D	S-P	4	6	11 x 12	510	720	S	LM	A	....	....	143	55	95	28400
812-CP	D	S-P	4	8	11 x 12	680	720	S	LM	A	....	....	178	68	95	32800
614-CP	D	S-P	4	6	11 x 14¼	504	600	S	LM	A	....	....	143	55	95	29800
814-CP	D	S-P	4	8	11 x 14¼	672	600	S	LM	A	....	....	178	68	95	34500
460-CP	D	S	4	4	16 x 20	600	360	S	LM	A	....	....	171	85	125	64700
462-CP	D	S	4	4	16 x 22	600	327	S	LM	A	....	....	171	85	125	64700
560-CP	D	S	4	5	16 x 20	750	360	S	LM	A	....	....	197	85	125	72800
562-CP	D	S	4	5	16 x 22	750	327	S	LM	A	....	....	197	85	125	72800
660-CP	D	S	4	6	16 x 20	900	360	S	LM	A	....	....	223	85	125	80900
662-CP	D	S	4	6	16 x 22	900	327	S	LM	A	....	....	223	85	125	80900
860-CP	D	S	4	8	16 x 20	1200	360	S	LM	A	....	....	275	106	125	101440
862-CP	D	S	4	8	16 x 22	1200	327	S	LM	A	....	....	275	106	125	101440
69-CPS	D	S-P	4	6	9 x 10½	450	720	S	LM	A	T	....	156	58	84	15740
89-CPS	D	S-P	4	8	9 x 10½	600	720	S	LM	A	T	....	184	58	84	18250
69-CPH	D	S-P	4	6	9 x 10½	384	900	B	LM	A	....	....	129	68	87	15500
89-CPH	D	S-P	4	8	9 x 10½	512	900	B	LM	A	....	....	158	68	87	19100
69-CPHS	D	S-P	4	6	9 x 10½	768	900	B	LM	A	T	....	129	68	89	16500
89-CPHS	D	S-P	4	8	9 x 10½	1032	900	B	LM	A	T	....	158	68	89	20100
412-CPS	D	S	4	4	11 x 12	615	720	S	LM	A	T	....	128	47	113	23400
512-CPS	D	S	4	5	11 x 12	770	720	S	LM	A	T	....	146	55	113	27500
612-CPS	D	S-P	4	6	11 x 12	925	720	S	LM	A	T	....	164	55	113	31600
812-CPS	D	S-P	4	8	11 x 12	1230	720	S	LM	A	T	....	215	68	113	35700

Chicago Pneumatic Tool Company, 6 East 44th Street, New York 17, N. Y. (Continued)

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lbh
614-CPS	D	S-P	4	6	11 x 14½	920	600	S	LM	A	T	....	164	55	113	32000
814-CPS	D	S-P	4	8	11 x 14¾	1225	600	S	LM	A	T	....	215	68	113	36000
623-CPS	D	S	4	6	12 x 13	1365	720	S	LM	A	T	....	196	86	135	39000
625-CPS	D	S	4	6	12 x 15	1315	600	S	LM	A	T	....	196	86	135	39000
825-CPS	D	S	4	8	12 x 13	1820	720	S	LM	A	T	....	225	86	135	47000
823-CPS	D	S	4	8	12 x 15	1750	600	S	LM	A	T	....	225	86	135	47000
1023-CPS	D	S	4	10	12 x 13	2280	720	S	LM	A	T	....	266	86	135	55000
1025-CPS	D	S	4	10	12 x 15	2200	600	S	LM	A	T	....	266	86	135	55000
460-CPS	D	S	4	4	16 x 20	950	360	S	LM	A	T	....	210	85	125	68130
462-CPS	D	S	4	4	16 x 22	950	327	S	LM	A	T	....	210	85	125	68130
560-CPS	D	S	4	5	16 x 20	1188	360	S	LM	A	T	....	236	106	125	76540
562-CPS	D	S	4	5	16 x 22	1188	327	S	LM	A	T	....	286	106	125	76540
660-CPS	D	S	4	6	16 x 20	1425	360	S	LM	A	T	....	262	106	125	84950
662-CPS	D	S	4	6	16 x 22	1425	327	S	LM	A	T	....	262	106	125	84950
860-CPS	D	S	4	8	16 x 20	1900	360	S	LM	A	T	....	320	116	125	106800
862-CPS	D	S	4	8	16 x 22	1900	327	S	LM	A	T	....	320	116	125	106800

* Continuous HP.

Clark Bros. Co., Olean, New York

Model††	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
RAD2	A	S	2	2	14 x 14	200	330	B-S	....	A	....	....	...	...	...	28700
RAD32	A	S	2	3	14 x 14	300	330	B-S	....	A	....	....	...	...	...	33850
RAD4	A	S	2	4	14 x 14	400	330	B-S	....	A	....	....	...	...	...	42700
RAD5	A	S	2	5	14 x 14	500	330	B-S	....	A	....	....	...	...	...	52700
RAD6	A	S	2	6	14 x 14	600	330	B-S	....	A	....	....	...	...	...	65550
RAD8	A	S	2	8	14 x 14	800	330	B-S	....	A	....	....	...	...	...	70400
DG4	A	M-S	2	4	12½ x 16	380–500	300–400	B-S	....	A	....	....	...	...	...	42000**
DG5	A	S	2	5	12½ x 16	475–675	300–400	B-S	....	A	....	....	...	...	...	.....
DG6	A	M-S	2	6	12½ x 16	570–750	300–400	B-S	....	A	....	....	...	...	...	56000**
DG8	A	S	2	8	12½ x 16	760–1000	300–400	B-S	....	A	....	....	...	...	...	.....
HMA-4	B	S-P†	2	4	8¼ x 8¼	175	600	..	LM	A	....	....	...	...	...	.....
HMA-6	B	S-P†	2	6	8¼ x 8¼	265	600	..	LM	A	....	....	...	...	...	.....
HMA-8	B	S-P†	2	8	8¼ x 8¼	350	600	..	LM	A	....	....	...	...	...	.....
HMA-10	B	S-P†	2	10	8¼ x 8¼	440	600	..	LM	A	....	....	...	...	...	.....
HMAB-6	B	S	2	6	8⅛ x 8⅛	330	600	..	LM	A	....	....	...	...	...	.....
HMAB-8	B	S	2	8	8⅛ x 8⅛	440	600	..	LM	A	....	....	...	...	...	.....
HMAB-10	B	S	2	10	8⅛ x 8⅛	550	600	..	LM	A	....	....	...	...	...	.....
HSRA-3	B	S	2	3	14 x 14	440	330	..	LM	A	M	....	...	...	...	.....
HSRA-4	B	S	2	4	14 x 14	600	330	..	LM	A	M	....	...	...	...	.....
HSRA-5	B	S	2	5	14 x 14	725	330	..	LM	A	M	....	...	...	...	.....
HSRA-6	B	S	2	6	14 x 14	880	330	..	LM	A	M	....	...	...	...	.....
HSRA-8	B	S	2	8	14 x 14	1200	330	..	LM	A	M	....	...	...	...	.....
HRA-8	B	S	2	8	14 x 14	1055	330	..	LM	A	....	....	...	...	...	.....
TRA-6	B	S	2	6	14 x 14	1200	360	..	LM	A	T	....	...	...	...	.....
TRA-7	B	S	2	7	14 x 14	1450	360	..	LM	A	T	....	...	...	...	.....
TRA-8	B	S	2	8	14 x 14	1650	360	..	LM	A	T	....	...	...	...	.....
TRA-10	B	S	2	10	14 x 14	1950	360	..	LM	A	T	....	...	...	...	.....
HBA-5	B	S	2	5	17 x 17	1200	330	..	LM	A	....	....	...	...	...	.....
HBA-6	B	S	2	6	17 x 17	1440	330	..	LM	A	....	....	...	...	...	.....
HBA-8	B	S	2	8	17 x 17	1920	330	..	LM	A	....	....	...	...	...	.....
HBA-10	B	S	2	10	17 x 17	2400	330	..	LM	A	....	....	...	...	...	.....
TLA-5	B	S	2	5	17 x 19	1850	330	..	LM	A	T	....	...	...	...	.....
TLA-6	B	S	2	6	17 x 19	2200	330	..	LM	A	T	....	...	...	...	.....
TLA-8	B	S	2	8	17 x 19	2950	330	..	LM	A	T	....	...	...	...	.....
TLA-10	B	S	2	10	17 x 19	3700	330	..	LM	A	T	....	...	...	...	.....

*Continuous HP ** Marine weight. † Semi portable. †† All engines have open type combustion chambers.

Climax Engine & Pump Mfg. Co., Clinton, Iowa

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
R110	B	S-P	4	4	6¼ x 7	95**	1050	..	B-HM	A-E-G	....	....	58	31	49	2450
R165	B	S-P	4	6	6¼ x 7	140**	1050	..	B-HM	A-E-G	....	....	74	30	51	3250
K67	B	S-P	4	6	7 x 7	194**	1050	..	B-HM	A-E-G	....	....	71	30	58	5400
K75	B	S-P	4	6	7¼ x 7	216**	1050	..	B-HM	A-E-G	....	....	71	30	58	5400
V80	B	S	4	8	7 x 7	250**	1050	..	B-HM	A-E-G	....	....	79	51	59	8400
V85	B	S	4	8	7¼ x 7	285**	1050	..	B-HM	A-E-G	....	....	79	51	59	8600
V122	B	S	4	12	7 x 7	380**	1050	..	B-HM	A-E-G	....	....	103	51	59	11000
V125	B	S	4	12	7¼ x 7	444**	1050	..	B-HM	A-E-G	....	....	103	51	59	11600
C46	B	S	4	1	5 x 6¾	7.5	600	..	HM	H-E-G	....	....	47	38	39	1360
C66	B	S	4	1	5¾ x 7⅓	11	550	..	HM	H-E-G	....	....	53	40	44	1575
C96	B	S	4	1	7 x 8½	16.6	500	..	HM	H-E-G	....	....	63	47	49	2580

Cont inuous HP ** Based on natural gas fuel

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Continental Motors Corporation, Muskegon, Michigan

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP.*	R.P.M.†	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight lb.
ZD129**	A	S**	4	4	3¼ x 3⅞	34	2000	R	....	E	....	....	...	...	...	485
GD157	A	M-S-P	4	4	3⅝ x 4⅜	39	2000	R-B	....	E	....	....	32	16	31	605
GD193	A	..	4	4	3¾ x 4⅜	55.5	2200	R	....	E	....	....	...	...	...	.....
ED201**	A	S**	4	4	3⅝ x 4⅞	45.8	2000	R-B	....	E	....	....	...	...	...	655
HD243	A	S-P	4	4	3¾ x 5½	68.9	2200	R-B	....	E	....	....	34	22	35	840
HD260**	A	S**	4	4	3⅞ x 5½	74	2400	R-B	....	E	....	....	34	22	35	840
HD277**	A	S**	4	4	4 x 5½	79	2400	R-B	....	E	....	....	34	22	35	850
JD382**	A	S**	4	4	4½ x 6	72.5	1600	B	....	E	....	....	...	...	...	925
JD403**	A	..	4	4	4⅝ x 6	91.5	2000	R	....	E	....	....	...	...	...	.....
TD427	A	S	4	6	4⅛ x 4⅞	132	2200	B	....	E	....	....	47	25	36	1300
RD572	A	S	4	6	4¾ x 5⅝	154	2000	B	....	E	....	....	52	30	43	1845
VD603	A	S	4	8	4¾ x 4¼	197	2600	R	....	E	....	....	44	34	47	1696

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
SD802	A	S	4	6	5 9/16 x 5 1/2	202	1800	B	....	E	....	....	....	....	....	2160
TD6427	A	M-P	4	6	4 3/16 x 4 7/8	146.5	2600	B	....	E	....	....	47	25	36	1270
RD6572	A	M-P	4	6	4 3/4 x 5 3/8	172	2400	B	....	E	....	....	52	30	46	1785
VD8603	A	P	4	8	4 3/4 x 4 1/4	200	2800	R	....	E	....	....	44	34	47	1680
SD6802	A	M-P	4	6	5 9/16 x 5 1/2	225	2200	B	....	E	....	....	....	....	....	2140
Y-112	B	S-P	4	4	3 3/16 x 3 1/2	30.7	2800	..	B-LM-HM	E	....	....	26	15	26	265
F-162	B	S-P	4	4	3 7/16 x 4 3/8	49	2800	..	B-LM-HM	E	....	....	29	16	29	370
F-226	B	S-P	4	6	3 3/16 x 4 3/8	67	2800	..	B-LM-HM	E	....	....	36	16	29	510
F-244	B	..	4	6	3 7/16 x 4 3/8	72.5	2800	..	B-LM-HM	E	....	....	....	....	....	790
M-330	B	S-P	4	6	4 x 4 3/8	104	2800	..	B-LM-HM	E	....	....	43	22	34	725
M-363	B	..	4	6	4 x 4 11/16	109.3	2800	..	B-LM-HM	E	....	....	....	....	....	800
H-260	B	..	4	4	3 7/8 x 5 1/2	57.1	1800	..	B-LM-HM	E	....	....	34	22	35	740
H-277	B	..	4	4	4 x 5 1/2	60.4	1800	..	B-LM-HM	E	....	....	....	....	....	....
K-363	B	..	4	6	4 x 4 11/16	130	2600	..	B-LM-HM	E	....	....	....	....	....	985
J-382	B	..	4	4	4 1/2 x 6	83.5	1600	..	B-LM-HM	E	....	....	....	....	....	950
T-427	B	..	4	6	4 3/16 x 4 7/8	135	2400	..	B-LM-HM	E	....	....	47	21	36	1100
B-427	B	S-P	4	6	4 3/16 x 4 7/8	127	2800	..	B-LM-HM	E	....	....	46	22	34	870
U-501	B	S-P	4	6	4 1/2 x 5 1/4	170.5	2600	..	B-LM-HM	E	....	....	52	28	45	1670
R-602	B	S-P	4	6	4 7/8 x 5 3/8	205	2600	..	B-LM-HM	E	....	....	52	28	45	1670
S-749	B	S-P	4	6	5 3/8 x 5 1/2	190.5	2000	..	B-LM-HM	E	....	....	58	28	48	1910
S-820	B	..	4	6	5 3/8 x 5 1/2	271	2600	..	B-LM-HM	E	....	....	....	....	....	2170

** Horsepower Given is Bare Engine Rating. ** Available for Industrial Applications only. † R.P.M. is Governed Speed.*

The Cooper-Bessemer Corporation, Mt. Vernon, Ohio

Model**	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.†	Height In.††	Weight Lb.†††
FW6	A	M-S-P	4	6	9 x 10 1/2	480	1000	S	....	A	....	O	130	35	80	17800
FW6T	A	M-S-P	4	6	9 x 10 1/2	720	1000	S	....	A	T	O	176	35	80	18300
FWB-6-LT	A	M-S-P	4	6	9 x 10 1/2	990	1000	S	....	A	T	O	176	35	80	23300
FVA8	A	M-S-P	4	8	9 x 10 1/2	575	1000	S	....	A	....	O	102	44	58	22000
FVB8T	A	M-S-P	4	8	9 x 10 1/2	1320	1000	S	....	A	T	O	124	44	58	27240
FVA12	A	M-S-P	4	12	9 x 10 1/2	860	1000	S	....	A	....	O	140	44	58	26000
FVB12T	A	M-S-P	4	12	9 x 10 1/2	1980	1000	S	....	A	T	O	140	44	58	37800
FVA16	A	M-S-P	4	16	9 x 10 1/2	1150	1000	S	....	A	....	O	165	44	58	32000
FVB16T	A	M-S-P	4	16	9 x 10 1/2	2640	1000	S	....	A	T	O	165	44	58	46430
GS6	D	M-S	4	6	10 1/2 x 13 1/2	565	750	O	B	A	....	D	142	38	68	21500
GS6T	D	M-S	4	6	10 1/2 x 13 1/2	1200	750	O	B	A	T	D	174	38	68	22250
GS8	D	M-S	4	8	10 1/2 x 13 1/2	775	750	O	B	A	....	D	175	38	68	29500
GS8T	D	M-S	4	8	10 1/2 x 13 1/2	1600	750	O	B	A	T	D	206	38	68	30250
JS5	D	S	4	5	13 x 16	515	450	O	B	A	....	....	149	45	80	41000
JS6	D	M-S	4	6	13 x 16	705	514	O	B	A	....	D	171	45	80	44000
JS6T	D	M-S	4	6	13 x 16	1485	514	O	B	A	T	D	200	45	80	45000
JS7	D	S	4	7	13 x 16	820	514	O	B	A	....	....	193	45	80	48000
JS7T	D	S	4	7	13 x 16	1735	514	O	B	A	T	....	221	45	80	49000
JS8	D	M-S	4	8	13 x 16	935	514	O	B	A	....	D	210	45	80	51000
JS8T	D	M-S	4	8	13 x 16	1980	514	O	B	A	T	D	239	45	80	52000
LS6	D	M-S	4	6	15 1/2 x 22	965	360	O	B	A	....	D	224	56	120	76000
LS6T	D	M-S	4	6	15 1/2 x 22	2040	360	O	B	A	T	D	251	56	120	77000
LS7	D	S	4	7	15 1/2 x 22	1125	360	O	B	A	....	....	248	56	120	91000
LS7T	D	S	4	7	15 1/2 x 22	2380	360	O	B	A	T	....	270	56	120	92000
LS8	D	M-S	4	8	15 1/2 x 22	1285	360	O	B	A	....	D	276	56	120	106000
LS8T	D	M-S	4	8	15 1/2 x 22	2720	360	O	B	A	T	D	299	56	120	107000
LSV12	D	M-S	4	12	15 1/2 x 22	1925	360	O	B	A	....	D	252	68	117	194500
LSV12T	D	M-S	4	12	15 1/2 x 22	4100	360	O	B	A	T	D	300	68	117	197500
LSV16	D	M-S	4	16	15 1/2 x 22	2565	360	O	B	A	....	D	307	68	117	232500
LSV16T	D	M-S	4	16	15 1/2 x 22	5450	360	O	B	A	T	D	355	68	117	237500

** * Engines have open combustion chamber. †† Height is given above shaft. † Width is between bolt centers. ††† All weights and dimensions for stationary units.*
** Continuous HP.*

Cummins Engine Company, Inc., Columbus, Indiana

Model	Type	Use††	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
J-6	A	M-S-P	4	6	4 1/2 x 5	100	1800	O	....	E	....	T	47	26	42	1505†
JF-6	A	M-S-P	4	6	4 1/2 x 5	110	2200	O	....	E	....	T	47	26	42	1545†
JN-6	A	M-S-P	4	6	4 1/2 x 5	130	2500	O	....	E	....	T	47	27	42	1555†
NHC-4	A	M-S-P	4	4	5 1/2 x 6	130	2000	O	....	E	....	T	44	27	48	1750†
JT-6	A	M-S-P	4	6	4 1/2 x 5	175	2500	O	....	E	T	S	47	28	44	1615†
JNS-6	A	M-S-P	4	6	4 1/2 x 5	175	2500	O	....	E	M	S	47	26	42	1600†
NT-6	A	M-S-P	4	6	5 1/2 x 6	250	2100	O	....	E	T	C	61	38	49	2515†
NTO-6	A	P-S-M	4	6	5 1/2 x 6	262	2100	O	....	E	T	....	61	38	49	2515†
NRT-6	A	M-S-P	4	6	5 1/2 x 6	300	2100	O	....	E	T	C	61	38	49	2525†
NRTO-6	A	M-S-P	4	6	5 1/2 x 6	335	2100	O	....	E	T	C	61	38	49	2525†
HRC-4	A	M-S-P	4	4	5 1/2 x 6	115	1800	O	....	E	....	T	44	32	48	1755†
JS-6	A	M-P	4	6	4 1/2 x 5	160	2500	O	....	E	M	....	47	25	40	1600†
H-6	A	M-S-P	4	6	4 1/2 x 6	160	1800	O	....	E	....	T	59	30	49	2330†
HR-6	A	M-S-P	4	6	5 1/2 x 6	175	1800	O	....	E	....	T	59	30	49	2330†
HRF-6	A	P	4	6	5 1/2 x 6	190	2000	O	....	E	....	....	60	30	49	2380†
HS-6	A	S-P	4	6	4 1/2 x 6	210	1800	O	....	E	M	T	58	32	49	2540†
NH180	A	P	4	6	4 7/8 x 6	180	2100	O	....	E	....	....	61	31	49	2400†
NH-220	A	M-S-P	4	6	5 1/2 x 6	220	2100	O	....	E	....	....	61	31	49	2400†
NHH-6	A	P	4	6	5 1/2 x 6	220	2100	O	....	E	....	....	66	61	23	2500†
HRS-6	A	M-S-P	4	6	5 1/2 x 6	240	1800	O	....	E	M	T	58	32	49	2540†
NHS-6	A	M-S-P	4	6	5 1/2 x 6	290	2100	O	....	E	M	C	60	34	49	2720†
NHRS-6	A	M-S-P	4	6	5 1/2 x 6	320	2100	O	....	E	M	C	60	34	49	2725†
NHHRS-6	A	P	4	6	5 1/2 x 6	320	2100	O	....	E	M	....	77	61	23	2805†
NVH-12	A	M-S-P	4	12	5 1/2 x 6	425	2100	O	....	E	....	S	73	49	55	5150†
VT-12	A	M-S-P	4	12	5 1/2 x 6	600	2100	O	....	E	T	C	73	45	60	6270†
L-6	A	M-S	4	6	7 x 10	265	1000	O	....	A-E	....	C	98	39	58	7590**
LR-6	A	M-S	4	6	7 1/4 x 10	320	1100	O	....	A-E	....	C	98	39	58	7590**
LR-6GAS	B	S	4	6	7 1/4 x 10	315	1100	..	HM	A-E	....	....	98	39	58	7590**
LRT-6	A	M-S	4	6	7 1/4 x 10	450	1100	O	....	A-E	T	C	99	39	59	7690†
HHR-6	A	P	4	6	5 1/2 x 6	175	1800	O	....	E	....	....	66	60	24	2420†
NHHT-6	A	P	4	6	5 1/2 x 6	250	2100	O	....	E	T	....	66	67	23	2590†
NHHRT-6	A	P	4	6	5 1/2 x 6	300	2100	O	....	E	T	....	66	67	23	2605†
NT-4	A	P	4	4	5 1/2 x 6	165	2000	O	....	E	T	....	44	29	53	1875†
J-4	A	P	4	4	4 1/2 x 5	75	2200	O	....	E	....	....	35	25	44	990†

** Maximum HP †† All except "L" models suitable for automotive and other portable applications.*
*† Automotive weight with all accessory equipment; also approx. weight of stationary engine w/o radiator or clutch and approx. weight of marine engine w/o reverse gear. ** Stationary engine and approx. marine weight w/o reverse gear.*

Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., 18th & Florida Streets, San Francisco, Calif.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
DM3	D†	M-S-P	4	3	8 x 10	73-162	450-1000	S	LM-P	A-E	....	**	60	41	64	8000
DM33	D	M-S-P	4	3	8 x 10	116-381	450-1000	S	LM-P	A-E	T	**	60	41	64	8700
DM4	D	M-S-P	4	4	8 x 10	97-216	450-1000	S	LM-P	A-E	....	**	68	41	67	10300
DM34	D	M-S-P	4	4	8 x 10	154-508	450-1000	S	LM-P	A-E	T	**	68	41	67	11100
DM6	D	M-S-P	4	6	8 x 10	146-324	450-1000	S	LM-P	A-E	....	**	92	41	64	13200
DM36	D	M-S-P	4	6	8 x 10	231-762	450-1000	S	LM-P	A-E	T	**	92	41	64	13800
DM8	D	M-S-P	4	8	8 x 10	194-432	450-1000	S	LM-P	A-E	....	**	116	41	64	16100
DM38	D	M-S-P	4	8	8 x 10	308-1015	450-1000	S	LM-P	A-E	T	**	116	41	64	18000
DG-6	D	M-S-P	4	6	12 x 15	273-819	250-750	S	LM-P	A	....	D	147	58	99	38800
DG-36	D	M-S-P	4	6	12 x 15	434-1928	250-750	S	LM-P	A	T	D	147	58	99	39900
DG-8	D	M-S-P	4	8	12 x 15	364-1092	250-750	S	LM-P	A	....	D	181	58	99	48000
DG-38	D	M-S-P	4	8	12 x 15	578-2570	250-750	S	LM-P	A	T	D	181	58	99	49962
DQ-6	D	M-S-P	4	6	16 x 20	647-1036	250-400	S	LM-P	A	....	D	197	74	126	87400
DQ-36	D	M-S-P	4	6	16 x 20	1028-2437	250-400	S	LM-P	A	T	D	197	74	126	89600
DQ-8	D	M-S-P	4	8	16 x 20	863-1381	250-400	S	LM-P	A	....	D	245	74	126	105518
DQ-38	D	M-S-P	4	8	16 x 20	1371-3249	250-400	S	LM-P	A	T	D	245	74	126	107918
DR-6	D	M-S-P	4	6	17 x 21	767-1228	250-400	S	LM-P	A	....	D	197	74	126	89900
DR-36	D	M-S-P	4	6	17 x 21	1219-2889	250-400	S	LM-P	A	T	D	197	74	126	92500
DR-8	D	M-S-P	4	8	17 x 21	945-1637	250-400	S	LM-P	A	....	D	245	74	126	107300
DR-38	D	M-S-P	4	8	17 x 21	1625-3852	250-400	S	LM-P	A	T	D	245	74	126	109900
DRV-12	D	M-S-P	4	12	17 x 21	1228-2455	200-400	S	LM-P	A	....	D	197	96	145	142600
DRV-12-3	D	M-S-P	4	12	17 x 21	2891-5782	200-400	S	LM-P	A	T	D	197	96	145	147900
DRV-16	D	M-S-P	4	16	17 x 21	1637-3274	200-400	S	LM-P	A	....	D	245	96	145	181800
DRV-16-3	D	M-S-P	4	16	17 x 21	3852-7703	200-400	S	LM-P	A	T	D	245	96	145	189100

*Continuous HP †All models available with trifuel equipment **Reverse and reduction gear used—make varies.

Fairbanks, Morse & Company, 600 S. Michigan Avenue, Chicago, Ill.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
31A6¼	A	M-S-P	2	5	6¼ x 9	175	720	O	....	A	....	D	...	...	...	.....
31A6¼	A	M-S-P	2	6	6¼ x 9	210	720	O	....	A	....	D	...	...	...	.....
31A6¼	A	M-S-P	2	7	6¼ x 9	245	720	O	....	A	....	D	...	...	...	.....
31A6¼	A	M-S-P	2	8	6¼ x 9	280	720	O	....	A	....	D	...	...	...	.....
31A8½	C	M-S-P	2	5	8½ x 11	300-325	514-525	O	....	A	....	D	...	...	...	.....
31A8½	C	M-S-P	2	6	8½ x 11	360-390	514-525	O	....	A	....	D	...	...	...	.....
31A8½	C	M-S-P	2	7	8½ x 11	420-455	514-525	O	....	A	....	D	...	...	...	.....
31A8½	C	M-S-P	2	8	8½ x 11	480-520	514-525	O	....	A	....	D	...	...	...	.....
31A18	C	S	2	6	18 x 27	2100	277	O	....	A	....	....	...	...	...	.....
31A18	C	S	2	8	18 x 27	2800	277	O	....	A	....	....	...	...	...	.....
31A18	C	S	2	10	18 x 27	3500	277	O	....	A	....	....	...	...	...	.....
32E12	C	S	2	2	12 x 15	120	360	O	....	A	....	....	...	...	...	.....
32E12	C	S	2	3	12 x 15	180	360	O	....	A	....	....	...	...	...	.....
32E14	C	S	2	2	14 x 17	150	300	O	....	A	....	....	...	...	...	.....
32E14	C	S	2	3	14 x 17	225	300	O	....	A	....	....	...	...	...	.....
32E14	C	S	2	4	14 x 17	300	300	O	....	A	....	....	...	...	...	.....
32E14	C	S	2	5	14 x 17	375	300	O	....	A	....	....	...	...	...	.....
32E14	C	S	2	6	14 x 17	450	300	O	....	A	....	....	...	...	...	.....
33F12	A	S	2	5	12 x 15	500	400	O	....	A	....	....	...	...	...	.....
33F12	A	S	2	6	12 x 15	600	400	O	....	A	....	....	...	...	...	.....
33F14	A	S	2	5	14 x 17	575	300	O	....	A	....	....	...	...	...	.....
33F14	A	S	2	6	14 x 17	690	300	O	....	A	....	....	...	...	...	.....
33F14	A	S	2	7	14 x 17	805	300	O	....	A	....	....	...	...	...	.....
33F16	C	S	2	4	16 x 20	800	300	O	....	A	....	....	...	...	...	.....
33F16	C	S	2	5	16 x 20	1000	300	O	....	A	....	....	...	...	...	.....
33F16	C	S	2	6	16 x 20	1200	300	O	....	A	....	....	...	...	...	.....
33F16	C	S	2	7	16 x 20	1400	300	O	....	A	....	....	...	...	...	.....
33F16	C	S	2	8	16 x 20	1600	300	O	....	A	....	....	...	...	...	.....
33F16	C	S	2	10	16 x 20	2000	300	O	....	A	....	....	...	...	...	.....
37F12	A	M	2	5	12 x 15	500	400	O	....	A	....	D	...	...	...	.....
37F12	A	M	2	6	12 x 15	600	400	O	....	A	....	D	...	...	...	.....
37E14	A	M	2	5	14 x 17	575	300	O	....	A	....	D	...	...	...	.....
37E14	A	M	2	6	14 x 17	690	300	O	....	A	....	D	...	...	...	.....
37E14	A	M	2	7	14 x 17	805	300	O	....	A	....	D	...	...	...	.....
37F16	A	M	2	5	16 x 20	1000	300	O	....	A	....	D	...	...	...	.....
37F16	A	M	2	6	16 x 20	1200	300	O	....	A	....	D	...	...	...	.....
37F16	A	M	2	7	16 x 20	1400	300	O	....	A	....	D	...	...	...	.....
37F16	A	M	2	8	16 x 20	1600	300	O	....	A	....	D	...	...	...	.....
37F16	A	M	2	10	16 x 20	2125	300	O	....	A	....	D	...	...	...	.....
38F5¼	D	M-S-P	2	4	5¼ x 7¼	150-330	600-1200	O	....	A-E	....	S	...	...	...	.....
38F5¼	D	M-S-P	2	5	5¼ x 7¼	188-413	600-1200	O	....	A-E	....	S	...	...	...	.....
38F5¼	D	M-S-P	2	6	5¼ x 7¼	225-495	600-1200	O	....	A-E	....	S	...	...	...	.....
38F5¼	D	M-S-P	2	7	5¼ x 7¼	263-578	600-1200	O	....	A-E	....	S	...	...	...	.....
38F5¼	D	M-S-P	2	8	5¼ x 7¼	300-660	600-1200	O	....	A-E	....	S	...	...	...	.....
38F5¼	D	M-S-P	2	10	5¼ x 7¼	375-825	600-1200	O	....	A-E	....	F	...	...	...	.....
38D8⅛	D	M-S-P	2	4	8⅛ x 10	400-800†	450-900	O	....	A	†	D	...	...	...	.....
38D8⅛	D	M-S-P	2	5	8⅛ x 10	500-1000†	450-900	O	....	A	†	D	...	...	...	.....
38D8⅛	D	M-S-P	2	6	8⅛ x 10	600-1200†	450-900	O	....	A	†	D	...	...	...	.....
38D8⅛	D	M-S-P	2	8	8⅛ x 10	800-1600†	450-900	O	....	A	†	D	...	...	...	.....
38D8⅛	D	M-S-P	2	10	8⅛ x 10	1000-2000†	450-900	O	....	A	†	D	...	...	...	.....
38D8⅛	D	M-S-P	2	12	8⅛ x 10	1200-2400†	450-900	O	....	A	†	D	...	...	...	.....
45C3¼	A	S	4	1	3¼ x 4	5¼	1800	D	....	H-E	....	....	...	...	...	.....
45C4½	A	S	4	1	4½ x 4½	10½	1800	D	....	H-E	....	....	...	...	...	.....
45C4½-2	A	M-S	4	2	4½ x 5¼	32	1800	D	....	H-E	....	C-P	...	...	...	.....
48A3½	A	M-S	4	2	3½ x 4	13¼	1800	O	....	E	....	S-T	...	...	...	.....
48A3½	A	M-S-P	4	4	3½ x 4	28	1800	O	....	E	....	C-P	...	...	...	.....
48A4½	A	M-S-P	4	4	4½ x 5	43-78	1200-2000	O	....	E	....	....	...	...	...	.....
49B4½	A	M-S-P	2	2	4½ x 5½	58	1800	....	....	A-E	....	....	...	...	...	.....
49B4½	A	M-S-P	2	3	4½ x 5½	90	1800	....	....	A-E	....	....	...	...	...	.....
49B4½	A	M-S-P	2	4	4½ x 5½	127	1800	....	....	A-E	....	....	...	...	...	.....
49B4½	A	M-S-P	2	6	4½ x 5½	180	1800	....	....	A-E	....	....	...	...	...	.....

* Continuous HP † All model 38D8 1/8 opposed piston engines are also offered with turbocharging with increased ratings up to 50% above ratings listed.

Ford Motor Company, Ford Division, Plymouth & Middlebelt Roads, Detroit, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	H.P.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
X	A	M-S-P	4	4	3.94 x 4.52	48	2250	**	....	E	....	....	31	28	35	690
Y	A	M-S-P	4	6	3.94 x 4.52	77	2250	**	....	E	....	....	42	24	40	880

* Continuous HP. ** Simm's.

General Motors Corporation, Cleveland Diesel Engine Division, 2160 W. 106 St., Cleveland, Ohio

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
3-268A	D	M-S	2	3	6½ x 7	150	1200	O	....	A-E	....	F	61	38	67**	5300
4-268A	D	M-S	2	4	6½ x 7	225	1200	O	....	A-E	....	F	71	38	67**	6150
6-268A	D	M-S	2	6	6½ x 7	340	1200	O	....	A-E	....	F	97	41	67**	7000
8-268A	D	M-S	2	8	6½ x 7	450	1200	O	....	A-E	....	F	117	41	67**	8600
8-498	D	M-S	2	8	8¾ x 10½	1400	850	O	....	A-E	T	F	159	64	112**	28600
12-498	D	M-S	2	12	8¾ x 10½	2100	850	O	....	A-E	T	F	193	64	112**	39000
16-498	D	M-S	2	16	8¾ x 10½	2800	850	O	....	A-E	T	F	234	66	121**	46000
8-567C	D	M-S	2	8	8½ x 10	800	800	O	....	A-E	....	F	140	63	112**	19500
12-567C	D	M-S	2	12	8½ x 10	1200	800	O	....	A-E	....	F	175	65	112**	27800
16-567C	D	M-S	2	16	8½ x 10	1600	800	O	....	A-E	....	F	214	62	112**	33900
16-358	B	M-S	2	16	12⅛ x 14½	3500	600	..	B	E	....	F	197	126	113**	86500

*Dimensions and weights are for basic engines. * Continuous HP. ** Height is over-all engine height.*

General Motors Corporation, Detroit Diesel Engine Division, 13400 W. Outer Drive, Detroit, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.††	Width In.††	Height In.††	Weight Lb.††
2-71	A	S-P	2	2	4.25 x 5	48–65	1800–2000	O	....	E-HY	M**	....	32	29	41	960
4–51	A	M-S-P	2	4	4.1 x 4.1	60–95	2200–3000	O	....	E-HY	M**	P	31	29	34	1180
3–71	A	M-S-P	2	3	4.25 x 5	75–113	1800–2300	O	....	E-A-G-HY	M**	O	38	30	41	1525
4–71	A	M-S-P	2	4	4.25 x 5	101–159	1800–2300	O	....	E-A-G-HY	M**	O	43	30	43	1770
4–71E	A	S-P	2	4	4.25 x 5	113–140	1800–2100	O	....	E	M**	....	44	37	41	1550
4–71T	A	S-P	2	4	4.25 x 5	171	2300	O	....	E-HY	T	....	44	46	41	1760
4–71T	A	M	2	4	4.25 x 5	202	2300	O	....	E-HY	T	O	60	39	35	1700
6–71	A	M-S-P	2	6	4.25 x 5	154–244	1800–2300	O	....	E-A-G-HY	M**	O	55	30	43	2190
6–71E	A	M-S-P	2	6	4.25 x 5	170–210	1800–2100	O	....	E-A-HY	M**	O	55	36	50	2010
6–71T	A	S-P	2	6	4.25 x 5	236	2100	O	....	E-A-HY	T	..	56	34	47	2255
6–71T	A	M	2	6	4.25 x 5	310	2300	O	....	E-HY	T	O	56	33	54	3025
Twin 4–71	A	S-P	2	8	4.25 x 5	202–286	1800–2100	O	....	E-A-G-HY	M**	..	70	56	58	4820
Twin 6–71	A	M-S-P	2	12	4.25 x 5	309–488	1800–2300	O	....	E-A-G-HY	M**	O	71	52	51	5320
Twin 6–71†	A	M	2	12	4.25 x 5	309–488	1800–2300	O	....	E-HY	M**	O	129	40	62	7550
Twin 6–71†	A	S-P	2	12	4.25 x 5	472	2100	..	....	E-A-G-HY	T	....	83	65	59	5970
Twin 6–71†	A	M	2	12	4.25 x 5	620	2300	..	....	E-A-HY	T	O	87	65	45	6350
Quad 6–71	A	M-S-P	2	24	4.25 x 5	618–925	1800–2100	O	....	E-A-G-HY	M**	O	143	57	58	12850
6–110	A	M-S-P	2	6	5 x 5.6	230–300	1800–2000	O	....	E-HY	M**	O	63	38	50	3260
Twin 6–110	A	S-P	2	12	5 x 5.6	460–600	1800–2000	O	....	E-A-G-HY	M**	....	126	66	88	11440
Twin 6–110†	A	M	2	12	5 x 5.6	460–650	1800–2000	O	....	E-A-HY	M**	O	146	54	72	10800

** Where a horsepower and rpm range is shown, the low end is the maximum continuous rating and the high end is the "Rated" (not continuous) brake horsepower for applications such as pleasure craft, fire boats and other intermittent operation.*
*† Tandem arrangement. ** Pressure Scavenging. †† Weights and dimensions are given for industrial ("S" & "P") units except on engines indicated as solely for marine application. Weights and dimensions for marine engines vary with gear selected and on "Twins" and "Quads", radiators and power take-offs are included. Torque converters are available with industrial models.*

General Motors Corporation, Electro-Motive Division, LaGrange, Illinois

Model	Type	Use†	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
6-567C	C	S-P	2	6	8½ x 10	540–600	720–800	O	....	E	....	....	126	65	89	15000
8-567C	C	S-P	2	8	8½ x 10	720–875	720–835	O	....	E	....	....	142	68	89	18000
12-567C	C	S-P	2	12	8½ x 10	1080–1310	720–835	O	....	E	....	....	156	65	89	25000
16-567C	C	S-P	2	16	8½ x 10	1440–1750	720–835	O	....	E	....	....	215	68	89	31500

† Engines are available for Marine use through Cleveland Diesel Engine Division, General Motors Corporation.
* Continuous HP.

Gray Marine Motor Company, 710 Canton Avenue, Detroit 7, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
4-D129	A	M	4	4	3¼ x 3⅞	20–25	1800–2000	R	B	E	....	S-P-W†	45	25	28	656
4-D157	A	M	4	4	3⅝ x 4⅝	24–30	1600–1800	R	B	E	....	S-C	50	26	31	1100
4-D277	A	M	4	4	4 x 5½	50–60	2000–2200	R	B	E	....	S-C	56	26	39	1440
6-D427	A	M	4	6	4⅛ x 4¾	110–130	2200–2400	R	B	E	....	S-C	67	28	35	1475
6-D572	A	M	4	6	4⅝ x 5⅜	135–150	2000–2200	R	B	E	....	S-C	68	29	42	2510
6-D802	A	M	4	6	5⅛ x 5½	157–190	2000–2200	R	B	E	....	C	78	31	43	2700

*All data is for complete marine units. * Continuous—Intermittent Ratings. † W—Warner Hydraulic.*

Harnischfeger Corporation, P & H Diesel Engine Division, 500 South Main Street, Crystal Lake, Illinois

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
287C-18	A	M-P	2	2	4¼ x 5¼	67	1800	R	....	E	M	S-T-C	33	29	41	1080
387C-18	A	M-P	2	3	4¼ x 5¼	103	1800	R	....	E	M	S-T-C	39	29	41	1350
487C-18	A	M-P	2	4	4¼ x 5¼	144	1800	R	....	E	M	S-T-C	46	29	41	1530
687C-18	A	M-P	2	6	4¼ x 5¼	205	1800	R	....	E	M	S-T-C	60	29	41	1900

*Weights shown are for "P" units. *Intermittent horsepower ratings with all accessories.*

Hercules Motors Corporation, Canton, Ohio

Model†	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.††	Width In.	Height In.†††	Weight Lb.††††
DD-149**	A	M-S-P	4	3	3¾ x 4½	38	1800	R-B	....	E	....	....	32	21	32	550
DD-169**	A	M-S-P	4	3	4 x 4½	43	1800	R-B	....	E	....	....	32	21	32	550
DIX4D	A	M-S-P	4	4	3⅝ x 4	48.5	2200	R-B	....	E	....	....	31	22	19	600
DIX4E	A	M	4	4	3⅝ x 4	75	3000	..	....	E	....	....	45	28	21	890
DIX4ES	A	M	4	4	3⅝ x 4	95	3000	..	....	E	M	....	45	32	21	990
TCD-188M	A	M	4	4	3⅝ x 4	78	2800	R-B	....	E	T	....	....	....	....	....
DD198**	A	M-S-P	4	4	3¾ x 4½	53.2	1800	R-B	....	E	....	....	31	22	33	600
DD226**	A	M-S-P	4	4	4 x 4½	60.5	1800	R-B	....	E	....	....	31	22	33	600
DOOD	A	M-S-P	4	4	4¼ x 4½	61.5	1800	R-B	....	E-G	....	....	30	23	20	750
DIX6-272	A	M-S-P	4	6	3 11/16 x 4¼	85	2200	R-B	....	A-E-G	....	....	39	24	38	800
DIX6-800	A	M-S-P	4	6	3⅞ x 4¼	94	2200	R-B	....	A-E-G	....	....	39	24	38	800
DIX6E	A	M	4	6	3⅝ x 4	115	3000	..	....	E	....	....	54	31	21	1380
DIX6ES	A	M	4	6	3⅝ x 4	150	3000	..	....	E	M	....	54	34	21	1490
TCD-288M	A	M	4	6	3⅝ x 4	120	2800	R-B	....	E	T	....	....	....	....	....
DJXC&H	A	M-S-P	4	6	3¾ x 4½	69–79	1800	R-B	....	A-E-G	....	....	37	28	21	950
DD298**	A	M-S-P	4	6	3¾ x 4½	79	1800	R-B	....	E	....	....	40	22	36	750
DD339**	A	M-S-P	4	6	4 x 4½	91	1800	R-B	....	E	....	....	40	22	36	750

Hercules Motors Corporation, Canton, Ohio (Continued)

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.††	Width In.	Height In.†††	Weight lb.††††
DWXLD	A	M-S-P	4	6	4¼ x 5	112	1800	R-B	....	A-E-G	....	....	41	27	25	1350
DRXC	A	M-S-P	4	6	4½ x 5¼	118	1600	R-B	....	A-E-G	....	....	45	26	25	1600
DFXE	A	M-S-P	4	6	5½ x 6	199	1600	R-B	....	A-E-G	....	....	56	30	31	2500
TCD-895	A	M-S-P	4	6	5½ x 6	258–318	1600–2000	R-B	....	A-E-G	T	....	75	28	52	2700
DFXH	A	M-S-P	4	6	5½ x 6	220–260	1600–2100	R-B	....	A-E-G	....	....	56	30	32	2600
DNXV8D	A	M-S-P	4	V-8	6¼ x 6	325–388	1600–2000	B	....	A-E-G	....	....	52	42	32	4200
TCD-1468	A	M-S-P	4	V-8	6¼ x 6	410–500	1600–1800	B	....	A-E-G	T	....	76	42	73	5000
C2-90D	B	M-S-P	4	2	4 x 3½	34.5	3000	..	B-H-M	H-E	....	....	28	25	33	274
CV4-180	B	M-S-P	4	4	4 x 3½	71	3000	..	B-H-M	E	....	....	23	28	35	463
GO-149	B	S-P	4	3	3¾ x 4½	38	1800	..	B-HM	H-E	....	....	32	21	32	475
GO-169	B	S-P	4	3	4 x 4½	43	1800	..	B-HM	H-E	....	....	32	21	32	475
ZXB	B	S-P	4	4	2¾ x 3	15.7	2500	..	B-HM	H-E	....	....	24	17	17	179
IXB	B	S-P	4	4	3¼ x 4	26.4	1800	..	B-HM	H-E	....	....	27	18	20	293
IXLB	B	S-P	4	4	3¼ x 4¼	28	1800	..	B-HM	H-E	....	....	27	18	20	293
GO-198	B	S-P	4	4	3¾ x 4½	46.5	1800	..	B-HM	H-E	....	....	31	22	33	500
GO-226	B	S-P	4	4	4 x 4½	51.5	1800	..	B-HM	H-E	....	....	31	22	33	500
QXD	B	S-P	4	6	3⅞ x 4¼	48.5	1800	..	B-HM	H-E	....	....	36	18	21	440
QXLD	B	S-P	4	6	3⅞ x 4¼	54.5	1800	..	B-HM	H-E	....	....	36	18	21	440
JXC	B	S-P	4	6	3¾ x 4½	60.4	1800	..	B-HM	H-E	....	....	39	19	25	605
GO-298	B	S-P	4	6	3¾ x 4½	69	1800	..	B-HM	H-E	....	....	40	22	34	650
JXD	B	S-P	4	6	4 x 4¼	69.7	1800	..	B-HM	H-E	....	....	39	19	25	605
JXLD	B	S-P	4	6	4 x 4½	77.6	1800	..	B-HM	H-E	....	....	39	19	25	630
GO-339	B	S-P	4	6	4 x 4½	78	1800	..	B-HM	H-E	....	....	40	22	34	650
WXLCS	B	S-P	4	6	4¼ x 4¾	89	1800	..	B-HM	H-E-A	....	....	43	27	29	825
RXC	B	S-P	4	6	4½ x 5¼	104–110.5	1800	..	B-HM	H-E-A	....	....	47	27	33	1010
RXLDH	B	S-P	4	6	4¾ x 5¼	116.5–125	1800	..	B-HM	H-E-A	....	....	47	26	36	1195
HXE	B	S-P	4	6	5¾ x 6	176	1600	..	B-HM	H-E-A	....	....	56	30	41	1830

* *Continuous HP.*
† *Engines have turbulence-chamber combustion system.* †† *Lengths measured from bellhousing face to front support.* ††† *Heights measured from crankshaft to top of cylinder head cover.* †††† *Weights are approximate and include engine with fuel handling equipment only and no other accessories not forming an integral part of the engine. Various mounting arrangements, flywheel housings, oil pans,, manifolds, starting motor and generator locations are available to meet specific applications requirements.* ** *Direct injection fuel system.*

Ingersoll-Rand Company, 11 Broadway, New York 4, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
T	A	M-S-P	4	6	7 x 8½	220	1000	O	....	A-E	.	**	86	45	69	....
T8	A	M-S-P	4	6	7 x 8½	350	1000	O	....	A-E	T	**	86	48	69	....
S	A	M-S-P	4	5	10½ x 12	375	750	O	....	A-E	....	**	116	49	85	....
S	A	M-S-P	4	6	10½ x 12	450	750	O	....	A-E	....	**	132	49	85	....
S	A	M-S-P	4	7	10½ x 12	525	750	O	.	A-E	..	**	149	49	85	....
S	A	M-S-P	4	8	10½ x 12	600	750	O	....	A-E	...	**	165	49	85	....
S8	A	M-S-P	4	5	10½ x 12	580	750	O	....	A-E	T	**	116	53	85	....
S8	A	M-S-P	4	6	10½ x 12	750	750	O	....	A-E	T	**	132	53	85	....
S8	A	M-S-P	4	7	10½ x 12	825	750	O	....	A-E	T	**	149	53	85	....
S8	A	M-S-P	4	8	10½ x 12	1000	750	O	....	A-E	T	**	165	53	85	....

*Continuous HP **Reverse & Reduction Gear varies.

International Harvester Company, 180 No. Michigan Avenue, Chicago 1, Illinois

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.†	Width In.	Height In.	Weight lb.†
UD-281	A	S-P	4	4	4⅛ x 5¼	60	1800	O	....	E-G	....	....	47	26	43	1616
UD-350	A	S-P	4	4	4½ x 5½	75	1800	O	....	E-G	....	....	50	27	44	2005
UD-14A	A	S-P	4	4	4¾ x 6½	100	1800	O	....	E-G	....	....	57	34	50	2586
UD-525	A	S-P	4	6	4½ x 5½	115	1800	O	....	E-G	....	....	69	36	50	2863
UD-18A	A	S-P	4	6	4¾ x 6½	125	1600	O	....	E-G	....	....	72	36	51	3606
UD-1091	A	S-P	4	6	5¾ x 7	202	1500	O	....	E-G	....	....	84	44	62	5372
UDT-1091	A	S-P	4	6	5¾ x 7	250	1500	O	....	E-G	T	....	84	44	62	5632
UC-60	B	S-P	4	4	2⅛ x 2¾	13.8	2500	..	B	E	....	....	35	19	32	401
U-123	B	S-P	4	4	3⅛ x 4	25.3	2000	..	B	E	....	....	46	22	35	666
U-175	B	S-P	4	4	3⅜ x 4¼	47.5	2000	..	B	E	....	....	43	25	40	966
U-281	B	S-P	4	4	4⅛ x 5¼	67	1800	..	B	E	....	....	43	26	43	1351
U-220	B	S-P	4	6	3 15/16 x 3 11/16	58.1	2400	..	B	E	....	....	52	28	42	1139
U-264-6	B	S-P	4	6	3 11/16 x 4⅛	68.5	2400	..	B	E	....	....	52	28	42	1212
U-308	B	S-P	4	6	3 13/16 x 4½	78.5	2400	..	B	E	....	....	52	28	42	1278
U-372	B	S-P	4	6	4⅜ x 4⅛	87.5	2200	..	B	E	....	....	57	28	50	1638
U-450	B	S-P	4	6	4⅜ x 5	105	2200	..	B	E	....	....	57	28	50	1721
U-501	B	S-P	4	6	4½ x 5¼	113.5	2200	..	B	E	....	....	57	28	50	1735
U-1091	B	S-P	4	6	5¾ x 7	232	1600	..	B	E	....	....	84	44	61	5464
UV-401	B	S-P	4	8	4⅛ x 3¾	142	2800	..	B	E	....	....	53	40	47	1577
UV-461	B	S-P	4	8	4⅛ x 4 5/16	162	2600	..	B	E	....	....	53	40	47	1587
UV-549	B	S-P	4	8	4½ x 4 5/16	192	2600	..	B	E	....	....	53	40	47	1592

* *Intermittent HP.—Horsepower shown is for complete power unit with radiator and fan as obtained at sea level and 60°F.*
† *Dimensions and weights from front of radiator to back face of flywheel housing, and do not include power take-off attachment or air cleaner.*

Kahlenberg Brothers Company, 1707-12th Street, Two Rivers, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
AD	A	M-S	2	2	8½ x 9	30–36	400	O	....	A	....	O	...	...	...	5450
AT	A	M-S	2	3	8½ x 9	45–54	400	O	....	A	....	O-D	...	...	...	6500
AF	A	M-S	2	4	8½ x 9	60–70	400	O	....	A	....	O-D	...	...	...	8200
BD	A	M-S	2	2	10 x 10½	50–60	375	O	....	A	....	O	...	...	...	7300
BT	A	M-S	2	3	10 x 10½	90	375	O	....	A	....	O-D	...	...	...	9700
BF	A	M-S	2	4	10 x 10½	120	375	O	....	A	....	O-D	...	...	...	11980
B5	A	M-S	2	5	10 x 10½	150	375	O	....	A	....	O-D	...	...	...	15650
B6	A	M-S	2	6	10 x 10½	180	375	O	....	A	....	O-D	...	...	...	17050
CT	A	M-S	2	3	12½ x 14	150	325	O	....	A	....	O-D	...	...	...	21730
CF	A	M-S	2	4	12½ x 14	200	325	O	....	A	....	O-D	...	...	...	23900
C5	A	M-S	2	5	12½ x 14	250	325	O	....	A	....	†D	...	...	...	29000
C6	A	M-S	2	6	12½ x 14	300	325	O	....	A	....	†D	...	...	...	34000
E4	A	M-S	2	4	10½ x 16	400–532	300–400	..	....	A	T	†D	115	76	79	22000
E5	A	M-S	2	5	10½ x 16	500–665	300–400	..	....	A	T	†D	130	76	79	26000
E6	A	M-S	2	6	10½ x 16	600–800	300–400	..	....	A	T	†D	146	76	79	30000
E7	A	M-S	2	7	10½ x 16	700–930	300–400	..	....	A	T	†D	162	76	79	34000
E8	A	M-S	2	8	10½ x 16	800–1065	300–400	..	....	A	T	†D	177	76	79	38000

* *Continuous HP.* † *Reduction gear optional.*

Kermath Diesel Division, Venn-Severin Engine Works, Inc., 12822 Simms Ave., Hawthorne, Calif.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
2-130	A	M	4	2	4¼ x 4½	30	1800	B	....	E	....	....	47	42	34	960†
6-935	A	M	4	6	5¾ x 6	250	2000	B	....	E	....	....	...	...	...	.....

* Maximum HP † Weight Direct Drive.

Lathrop Engine Division, Burmeister & Wain American Corporation, Mystic, Conn.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
D-60	A	M	4	4	5½ x 7	60	900	B	....	E	....	O	75	29	31	3000
D-120	A	M	4	6	5½ x 7	120	1100	B	....	E	....	S	108	31	31	4100

*Continuous HP

LeRoi Division, Westinghouse Air Brake Co., 1706 South 68th Street, Milwaukee 14, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
D226	B	S-P	4	4	4 x 4½	40.5	1800	..	HM†	E-H	....	....	54	25	48	850†††
A288	B	S	4	1	7¼ x 7	17	720	..	HM†	E-H	....	....	64	47	54	2300†††
A114	B	S	4	1	5¾ x 5¼	11.9	1200	..	HM†	E-H	....	....	47	49	51	1530†††
H840	B	S-P	4	8	4½ x 4¼	140	2400	..	HM†	E-A	....	....	81	40	64	2000†††
H844	B	S-P	4	8	5¼ x 4¼	190	2200	..	HM†	E-A	....	....	88	50	74	3200
F1500	B	S-P	4	6	6¾ x 7	159	1100	..	HM††	G-A-E	....	....	115	50	84	5805
H2000	B	S	4	8	6¾ x 7	213	1100	..	HM††	G-A-E	....	....	88	52	72	5850
L3000	B	S	4	12	6¾ x 7	324	1100	..	HM††	G-A-E	....	....	111	60	84	8300
L3460	B	S	4	12	7¼ x 7	445	1200	..	HM††	G-A-E	....	....	167	66	86	12800
L4000	B	S	4	12	7.54 x 7.5	493	1200	..	HM††	G-A-E	....	....	169	66	91	12850

*Continuous HP †Distributor available. ††LM available. †††Lighter automotive units available. Weights are given for stationary units (dry).

Lufkin Foundry & Machine Co., Lufkin, Texas

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
H833	B	S	2	2	5½ x 7	20-30	425-650	..	HM	E-A	....	....	59	53	52	3200
M795	B	S	2	2	7½ x 9	45-65	400-600	..	HM	E-A	....	....	76	68	60	4250

*Continuous HP

Mack Trucks Inc., 1355 W. Front St., Plainfield, New Jersey

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
END673	A	P	4	6	4⅞ x 6	170	2100	B	....	E-A	....	....	51	27	45	1917
ENDL673	A	P	4	6	4⅞ x 6	170	2100	B	....	E-A	....	....	51	27	45	1837
ENDT673	A	P	4	6	4⅞ x 6	205	2100	B	....	E-A	T	....	51	31	45	2032
ENDLT673	A	P	4	6	4⅞ x 6	205	2100	B	....	E-A	T	....	51	31	45	1952

*Continuous HP

Minneapolis-Moline Company, Minneapolis 1, Minnesota

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
206H-4A	B†	S-P	4	4	3⅝ x 5	21-45	800-1500	..	B-HM	E	....	....	38	21	36	900
283-4A	D	S-P	4	4	4¼ x 5	32-59	800-1400	B	B-HM	E	....	....	46	25	46	1400
403-4A	B	S-P	4	4	4⅝ x 6	52-79	800-1300	..	B-HM	E	....	....	46	25	46	1590
425A-6A	D	S-P	4	6	4¼ x 5	48-85	800-1400	B	B-HM	E	....	....	60	25	48	2100
605A-6A	D	S-P	4	6	4⅝ x 6	72-100	800-1200	B	B-HM	E	....	....	60	29	54	2500
800-6A	B†	S-P	4	6	5⅝ x 6	98-148	800-1300	..	B-HM	E	....	....	60	29	54	3125
D283-4A	A	S-P	4	4	4¼ x 5	28-46	800-1300	B	....	E	....	....	...	...	...	.....
D425-6A	A	S-P	4	6	4¼ x 5	42-77	800-1400	B	....	E	....	....	...	...	...	.....
D605-6A	A	S-P	4	6	4⅞ x 6	66-95	800-1400	B	....	E	....	....	...	...	...	.....

* Continuous HP † Type "B" engine includes gasoline, natural gas, LPG and tractor fuel.

Murphy Diesel Company, 5317 West Burnham Street, Milwaukee, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
ME4	A	P-M	4	4	5¾ x 6½	96-112	1200	O	....	E-GA	....	....	71	43	65	3800
11	A	P-M	4	4	5¾ x 6½	107-117	1200-1400	O	....	E-GA	....	....	71	43	65	3850
12	A	P-M	4	4	6 x 6½	117-127	1200-1400	O	....	E-GA	....	....	71	43	65	3850
20†	C	P-M	4	6	5½ x 6½	144-159	1200-1400	O	....	E-GA	....	....	93	43	65	4700
120	A	P-M	4	6	5½ x 6½	155-170	1200-1400	O	....	E-GA	T	....	93	43	65	4800
21†	C	P-M	4	6	5¾ x 6½	161-176	1200-1400	O	....	E-GA	....	....	93	43	65	4700
22†	C	P-M	4	6	6 x 6½	177-193	1200-1400	O	....	E-GA	....	....	93	43	65	4700
121	A	P-M	4	6	5¾ x 6½	182-202	1200-1400	O	....	E-GA	....	....	93	43	65	4800
122	A	P-M	4	6	6 x 6½	203-227	1200-1400	O	....	E-GA	T	....	93	43	65	4800
24†	C	P-M	4	6	6⅛ x 6½	198-213	1200-1400	O	....	E-GA	T	....	93	43	65	4700
324	A	P-M	4	6	6⅛ x 6½	241-257	1200-1400	O	....	E-GA	T	....	93	43	65	4800
111	A	PS	4	4	5¾ x 6½	123-133	1200	O	....	AEG	T	....	71	43	65	3850
112	A	PS	4	4	6 x 6½	133-149	1200	O	....	AEG	T	....	71	43	65	3850
211	A	PS	4	4	5¾ x 6½	118-128	1400	O	....	AEG	....	....	71	43	65	3800
212	A	PS	4	4	6 x 6½	128-138	1400	O	....	AEG	....	....	71	43	65	3800
311	A	PS	4	4	5¾ x 6½	133-143	1400	O	....	AEG	T	....	71	43	65	3850
312	A	PS	4	4	6 x 6½	144-154	1400	O	....	AEG	T	....	71	43	65	3850
124	A	PS	4	6	6⅛ x 6½	225-240	1200	O	....	AEG	T	....	93	43	65	4800
220†	A	PS	4	6	5½ x 6½	157-169	1400	O	....	AEG	....	....	93	43	65	4700
320	A	PS	4	6	5½ x 6½	170-182	1400	O	....	AEG	T	....	93	43	65	4800
221†	A	PS	4	6	5¾ x 6½	173-185	1400	O	....	AEG	....	....	93	43	65	4700
222†	A	PS	4	6	6 x 6½	190-204	1400	O	....	AEG	....	....	93	43	65	4700

Murphy Diesel Company, 5317 West Burnham Street, Milwaukee, Wisconsin (Continued)

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
321	A	PS	4	6	5¾ x 6½	197–210	1400	O	....	AEG	T	....	93	43	65	4800
224†	A	PS	4	6	6¾ x 6½	214–230	1400	O	....	AEG	....	....	93	43	65	4700
322	A	PS	4	6	6 x 6½	220–235	1400	O	....	AEG	T	....	93	43	65	4800

All engines have open-type combustion chambers and unit injectors. Marine engines carry different model numbers, weights and dimensions. Ratings shown are with power consuming accessories and corrected to 29.92-in. & 60°F.

** Continuous—Intermittent HP. † When this Model No. is followed by designation "G", engine is dual-fuel.*

Nordberg Manufacturing Co., Milwaukee, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
4FS-1	A	S-P	4	1	4½ x 5¼	10–15	1200–1800	B	....	E-H	....	....	...	...	...	.....
4FG-1	B	S	4	1	4½ x 5¼	8–18	800–1800	..	HM	E-H	....	....	...	...	...	.....
4FS-2	A	S-P	4	2	4½ x 5¼	20–30	1200–1800	B	....	E-H	....	....	...	...	...	.....
4FG-2	B	S	4	2	4½ x 5¼	16–36	800–1800	..	HM	E-H	....	....	...	...	...	.....
4FS-3	A	S-P	4	3	4½ x 5¼	30–45	1200–1800	B	....	E-H	....	....	...	...	...	.....
FS-96-HSC**	D	M-S	4	6	9 x 11½	640	720	S	LM	A	T	D	...	...	...	.....
FS-98-HSC**	D	M-S	4	8	9 x 11½	850	720	S	LM	A	T	D	...	...	...	.....
FS-135-HSC**	D	S	4	5	13–13½ x 16½	1000–1350	450–514	S	P	A	T	....	...	...	...	.....
FS-136-HSC**	D	M-S	4	6	13–13½ x 16½	1200–1625	450–514	S	P	A	T	D	...	...	...	.....
FS-137-HSC**	D	S	4	7	13–13½ x 16½	1400–1900	450–514	S	P	A	T		...	...	...	.....
FS-138-HSC**	D	M-S	4	8	13–13½ x 16½	1600–2175	450–514	S	P	A	T	D	...	...	...	.....
FS-1310-HSC**	D	M-S	4	10	13–13½ x 16½	2000–2700	450–514	S	P	A	T	D	...	...	...	.....
FS-1312-HSC**	D	M-S	4	12	13–13½ x 16½	2400–3240	450–514	S	P	A	T	D	...	...	...	.....
FS-1316-HSC**	D	M-S	4	16	13–13½ x 16½	3200–4300	450–514	S	P	A	T	D	...	...	...	.....
RTS-1412***	D	S	2	12	14 x 16	2125–3200	400–450	B	P	A	....	....	...	...	...	.....
TS-215-31	C	M-S	2	5	21½ x 31	2550–2925	240–257	B	....	A	....	D	...	...	...	.....
TS-216-31	C	M-S	2	6	21½ x 31	3050–3500	240–257	B	....	A	....	D	...	...	...	.....
TS-217-31	C	M-S	2	7	21½ x 31	3575–4100	240–257	B	....	A	....	D	...	...	...	.....
TS-218-31	C	M-S	2	8	21½ x 31	4075–4675	240–257	B	....	A	....	D	...	...	...	.....
TS-219-31	C	M-S	2	9	21½ x 31	4600–5275	240–257	B	....	A	....	D	...	...	...	.....
TS-2110-31	C	M-S	2	10	21½ x 31	5100–5850	240–257	B	....	A	....	D	...	...	...	.....
TS-2112-31	C	M-S	2	12	21½ x 31	6160–7025	240–257	B	....	A	....	D	...	...	...	.....
TS-296	C	M-S	2	6	29 x 40	5670–6400	189–200	B	....	A	....	D	...	...	...	.....
TS-297	C	M-S	2	7	29 x 40	6620–7500	189–200	B	....	A	....	D	...	...	...	.....
TS-298	C	M-S	2	8	29 x 40	7570–8500	189–200	B	....	A	....	D	...	...	...	.....
TS-299	C	M-S	2	9	29 x 40	8500–9600	189–200	B	....	A	....	D	...	...	...	.....
TS-2910	C	M-S	2	10	29 x 40	9450–10600	189–200	B	....	A	....	D	...	...	...	.....
TS-2912	C	M-S	2	12	29 x 40	11350–12800	189–200	B	....	A	....	D	...	...	...	.....

**Engines are designed to operate continuously at ratings shown and are good for 10 per cent overload for 2 hr in any 24 hr period.*
***Supairthermal execution ***Radial Engine*

Oliver Corporation, 400 W. Madison St., Chicago, Illinois

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
Super 166D	A	S-M-P	4	4	3½ x 3¾	28.1	1800	B	....	E	....	**	40	22	39	781
Super 177D	A	S-M-P	4	6	3½ x 3¾	39.0	1800	B	....	E	....	**	49	22	39	950
Super 188D	A	S-M-P	4	6	3¾ x 4	48.0	1800	B	....	E	....	**	52	24	47	1108
Super 199D	A	S-M-P	4	6	4 x 4	57.0	1800	B	....	E	....	**	52	24	47	1165
Super 225D	A	S-P	4	6	4⅝ x 5¼	100.0	1800	R	....	E	....	....	59	30	49	2344
Super 166HC	B	S-P	4	4	3½ x 3¾	28.1	1800	..	B-HM	E	....	**	40	22	39	728
Super 177HC	B	S-P	4	6	3½ x 3¾	40.6	1800	..	B-HM	E	....	**	49	22	39	913
Super 188HC	B	S-P	4	6	3¾ x 4	49.0	1800	..	B-HM	E	....	**	52	24	47	1035
Super 199HC	B	S-P	4	6	4 x 4	57.1	1800	..	B-HM	E	....	**	52	24	47	1088

** Continuous HP. ** Reverse Gear Available.*

Rathbun-Jones Engineering Company, Toledo, Ohio

Model**	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.†	Width In.††	Height In.	Weight Lb.†††
18	C	S	4	3	11 x 18	220	450	O	....	A	....	....	158	70	106	26000
18	C	S	4	4	11 x 18	290	450	O	....	A	....	....	177	70	106	31500
18	C	S	4	5	11 x 18	364	450	O	....	A	....	....	196	70	106	36300
18	C	M-S	4	6	11 x 18	435	450	O	....	A	....	D	215	70	106	41200
18	C	M-S	4	7	11 x 18	510	450	O	....	A	....	D	238	70	106	46000
18	C	M-S	4	8	11 x 18	580	450	O	....	A	....	D	258	70	106	51000
22	C	S	4	3	15½ x 22	388	327	O	....	A	....	....	175	80	126	41500
22	C	S	4	4	15½ x 22	518	327	O	....	A	....	....	197	80	126	50000
22	C	S	4	5	15½ x 22	650	327	O	....	A	....	....	225	80	126	58500
22	C	M-S	4	6	15½ x 22	775	327	O	....	A	....	D	247	80	126	68000
22	C	M-S	4	7	15½ x 22	910	327	O	....	A	....	D	271	80	126	75500
22	C	M-S	4	8	15½ x 22	1035	327	O	....	A	....	D	298	80	126	85000
24	C	S	4	3	18¼ x 24	540	300	O	....	A	....	....	200	85	140	60000
24	C	S	4	4	18¼ x 24	720	300	O	....	A	....	....	231	85	140	74000
24	C	S	4	5	18¼ x 24	900	300	O	....	A	....	....	258	85	140	87000
24	C	M-S	4	6	18¼ x 24	1080	300	O	....	A	....	D	294	85	140	98000
24	C	M-S	4	7	18¼ x 24	1260	300	O	....	A	....	D	321	85	140	110000
24	C	M-S	4	8	18¼ x 24	1440	300	O	....	A	....	D	348	85	140	120000
28	C	S	4	5	19½ x 28	1025	257	O	....	A	....	....	332	104	171	140000
28	C	M-S	4	6	19½ x 28	1230	257	O	....	A	....	D	339	104	171	164000
28	C	M-S	4	7	19½ x 28	1435	257	O	....	A	....	D	380	104	171	187000
28	C	M-S	4	8	19½ x 28	1640	257	O	....	A	....	D	409	104	171	212000
28	C	S	4	10	19½ x 28	2050	257	O	....	A	....	....	460	104	171	230000
28	C	S	4	12	19½ x 28	2460	257	O	....	A	....	....	528	104	171	260000

** Continuous HP ** Engines have Price turbulence chamber combustion system and Rathbun distributor type fuel injection system. †Lengths listed are approximate for stationary engines and include generator, exciter drive and outboard bearing. †† Widths include operating platforms. Marine lengths, including thrust bearing, are considerably shorter. ††† Weights are for stationary units.*

R. H. Sheppard Company, Inc., Hanover, Pennsylvania

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
17B	A	M-S-P	4	2	3½ x 4	25	1800	O	....	E	....	*	25	18	26	435
19B	A	M-S-P	4	4	3½ x 4	50	1800	O	....	E	....	*	39	18	26	600
16B	A	M-S-P	4	4	4½ x 5	100	1800	O	....	E	....	*	47	22	46	1600

**Maximum HP*

Sterling Engine Company, Inc., Menominee, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
AB-6	A	M-S	4	6	4½ x 5½	72–110	1400–1800	B	....	E	....	S	58	30	53	3150
DB-6	A	M-S	4	6	5½ x 7	114–170	1200–1500	B	....	E	....	S	60	36	60	5200
DB-8	A	M-S	4	8	5½ x 7	152–230	1200–1500	B	....	E	....	S	75	36	60	6850
VD-6	A	M-S	4	6	8 x 9	420	1200	B-S	....	A-E	....	....	98	40	64	8500
VD-6-S	A	M-S	4	6	8 x 9	750	1200	B	....	A-E	T	....	115	40	64	9160
VD-8-S	A	S	4	8	8 x 9	1000	1200	B	....	A-E	T	....	136	40	64	12450
LC-6	B	S	4	6	5¼ x 6	72–110	800–2000	..	B	E	....	....	57	33	42	2200
TC-6	B	S	4	6	8 x 9	260–450	700–1200	..	B	A-E	....	....	101	45	64	6900
TC-8	B	S	4	8	8 x 9	565–600	700–1200	..	B	A-E	....	....	122	45	64	9000

Weights and dimensions are given for "S" units. **Horsepower listings indicate continuous and intermittent ratings.*

Union Diesel Engine Company, Oakland 6, Calif.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	H.P.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
GA6	D	M-S	4	6	8½ x 11	150–240	475–600	O	....	A	....	D	114	34	72	12500
GA6S	D	M-S	4	6	8½ x 11	225–350	475–600	O	....	A	T	D	117	34	72	13500
L6	D	M-S	4	6	10 x 14	230–335	350–514	O	....	A	....	D	135	42	85	20000
L6S	D	M-S	4	6	10 x 14	300–530	350–514	O	....	A	T	D	135	42	85	21000
P6	D	M-S	4	6	12 x 15	380–575	400–514	O	....	A	....	D	162	46	93	34500
P6S	D	M-S	4	6	12 x 15	525–800	400–514	O	....	A	T	D	166	46	93	36000
V6	D	M-S	4	6	14 x 19	450–750	300–400	O	....	A	....	D	185	57	114	53000
V6S	D	M-S	4	6	14 x 19	750–1100	300–400	O	....	A	T	D	185	57	114	54500
Z6	D	M-S	4	6	16 x 20½	600–925	240–360	O	....	A	....	D	203	62	125	80000
Z6S	D	M-S	4	6	16 x 20½	750–1400	240–360	O	....	A	T	D	203	62	125	82000
GA8	D	M-S	4	8	8½ x 11	200–310	450–600	O	....	A	....	D	144	34	72	16000
GA8S	D	M-S	4	8	8½ x 11	300–460	450–600	O	....	A	T	D	151	34	72	17000
L8	D	M-S	4	8	10 x 14	265–445	350–514	O	....	A	....	D	171	42	85	26000
L8S	D	M-S	4	8	10 x 14	400–700	350–514	O	....	A	T	D	171	42	85	26500
P8	D	M-S	4	8	12 x 15	450–700	400–514	O	....	A	....	D	198	46	93	45000
P8S	D	M-S	4	8	12 x 15	750–1150	400–514	O	....	A	T	D	202	46	93	46500
V8	D	M-S	4	8	14 x 19	600–1000	300–400	O	....	A	....	D	234	57	114	70000
V8S	D	M-S	4	8	14 x 19	900–1400	300–400	O	....	A	T	D	234	57	114	72000
Z8	D	M-S	4	8	16 x 20½	750–1200	240–360	O	....	A	....	D	259	62	125	98000
Z8S	D	M-S	4	8	16 x 20½	1050–1875	240–360	O	....	A	T	D	259	62	125	100000

**Continuous HP*

Waukesha Motor Company, Waukesha, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	H P.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
ICK	B	S-P	4	4	2½ x 3½	14	2000	..	B-HM	H-E	....	....	22	13	21	195
FC	B	S-P	4	4	3¼ x 4	26	1800	..	B-HM	H-E	....	....	28	19	21	290
180GLB	B	S-P	4	4	3½ x 3¾	34†	2000	..	B-HM	H-E	....	....	31	19	28	450
180DLC	A	S-P	4	4	3½ x 3¾	31†	2000	B-R	....	H-E	....	....	31	19	28	475
XAH	B	S-P	4	4	3½ x 4½	35	1800	..	B-HM	H-E	....	....	33	19	27	385
185GLB	B	S-P	4	6	3½ x 3¾	50	2000	..	B-HM	H-E	....	....	31	22	30	675
185DLC	A	S-P	4	6	3½ x 3¾	44	2000	B-R	....	H-E	....	....	31	22	30	675
190GLB	B	S-P	4	6	3¾ x 4	60	2000	..	B-HM	H-E	....	....	43	22	30	690
190DLCA	A	S-P	4	6	3¾ x 4	58†	2000	B-R	....	H-E	....	....	43	22	29	768
195GL	B	S-P	4	6	4 x 4	65	2000	..	B-HM	H-E	....	....	43	22	30	775
195DLCA	A	S-P	4	6	4 x 4	67†	2000	B-R	....	E	....	....	43	26	30	865
197-DLCS	A	S-P	4	6	4 x 4	94	2200	R	....	H-E	T	....	44	26	40	890
195GK	B	S-P	4	6	4¼ x 4	71	2000	..	B-HM	H-E	....	....	44	22	30	780
195-GKA	B	S-P	4	6	4⅛ x 4	73†	2000	..	B-HM	H-E	....	....	44	22	30	800
MZA	B	S-P	4	6	4¼ x 4¾	77	1600	..	B-HM	H-E	....	....	44	21	34	920
135-CKB	B	S-P	4	6	4¼ x 5	98†	2000	..	B-HM	E	....	....	47	26	38	1325
135DKB	A	S-P-M	4	6	4¼ x 5	99†	2000	G-B-R	....	E	....	....	48	26	35	1386
135DKBS	A	S-P-M	4	6	4¼ x 5	121†	2000	G-B-R	....	E	T	....	48	26	41	1486
135C-ZB	B	S-P	4	6	4⅜ x 5	104†	2000	..	B-HM	E	....	....	48	26	38	1325
140GKB	B	S-P	4	6	4½ x 5½	112†	1800	..	B-HM	E	....	....	52	26	43	1390
140-GZB	B	S-P	4	6	4½ x 5½	117†	1800	..	B-HM	E	....	....	52	26	43	1390
145GKB	B	S-P	4	6	5¼ x 6	160†	1800	..	B-HM	E-G	....	....	56	29	47	1810
148DKB	A	S-P-M	4	6	5¼ x 6	147†	1800	B	....	E-G	....	....	56	29	47	2320
148DKBS	A	S-P-M	4	6	5¼ x 6	194†	1800	B	....	E-G	T	....	56	29	56	2445
145GZB	B	S-P	4	6	5⅜ x 6	167†	1800	..	B-HM	E-G	....	....	56	29	47	1820
WAKB	B	S-P	4	6	6¼ x 6½	227†	1600	..	B-HM-LM	E-G-A	....	....	67	33	51	3150
WAKR	B	S-P	4	6	6¼ x 6½	217†	1600	..	B-HM-LM	E-G-A	....	....	67	33	51	3050
WAKDB	A	S-P-M	4	6	6¼ x 6½	195†	1600	B	....	E-G-A	....	....	67	33	51	3800
WAKDBS	A	S-P-M	4	6	6¼ x 6½	259†	1600	B	....	E-G-A	T	....	67	33	63	3925
NKRB	B	S-P	4	6	7 x 8¼	260†	1200	..	HM-LM	G-A	....	....	79	48	61	6900
NKDB	A	S-P-M	4	6	7 x 8¼	238†	1200	B	....	G-A	....	....	79	48	61	9285
NKDBS	A	S-P-M	4	6	7 x 8¼	312†	1200	B	....	G-A	T	....	79	48	61	9435
LRORB	B	S-P	4	6	8⅛ x 8½	372†	1200	..	HM-LM	G-A	....	....	98	49	70	9940
LRDB	A	S-P-M	4	6	8⅛ x 8½	332†	1200	B	....	G-A	....	....	98	49	70	10300
LRDBCS	A	S-P-M	4	6	8⅛ x 8½	556†	1200	B	....	G-A	T	....	114	49	70	10450
LRZB	B	S-P	4	6	9¼ x 8½	475†	1200	..	HM-LM	G-A	....	....	114	60	73	11250
VLROB	B	S-P	4	12	8½ x 8½	720†	1200	..	LM	G-A	....	....	130	60	58	15000
VLRDB	A	S-P-M	4	12	8½ x 8½	664†	1200	B	....	G-A	....	....	130	60	58	15500
VLRDBS	A	S-P-M	4	12	8⅛ x 8½	990†	1200	B	....	G-A	T	....	134	60	58	16300

** Continuous hp ratings are based on 80 per cent of maximum at speeds indicated. Gas ratings on LPG; natural gas approx. 10 per cent lower.*
† Counter balanced crankshaft.

White Diesel Engine Division, The White Motor Company, Springfield, Ohio

Superior Engines

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight lb.
6G-510	B	S-P	4	6	8⅛ x 9	190–400	600–1200	..	HM	A-G	....	....	....	....	....	.....
6G-825	B	S-P	4	6	10 x 10½	300–600	600–1200	..	HM	A-G	....	....	....	....	....	.....
8G-825	B	S-P	4	8	10 x 10½	400–800	600–1200	..	HM	A-G	....	....	....	....	....	.....
40-6	A	M-S-P	4	6	8⅛ x 10½	215–425	600–1000	B-S	....	A	....	....	....	....	....	.....
40-8	A	M-S-P	4	8	8⅛ x 10½	290–570	600–1000	B-S	....	A	....	....	....	....	....	.....
40X-6	A	M-S-P	4	6	8⅛ x 10½	325–700	600–1000	B-S	....	A	T	....	....	....	....	.....

White Diesel Engine Division, The White Motor Company, Springfield, Ohio (Continued)

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
40X-8	A	M-S-P	4	8	8½ x 10½	435-940	600-1000	B-S	....	A	T	....	...	...	...	.....
40C-6	A	M-S-P	4	6	8½ x 10½	240-460	700-1100	B-S	....	A	....	....	...	...	...	.....
40C-8	A	M-S-P	4	8	8½ x 10½	325-620	700-1100	B-S	....	A	....	....	...	...	...	.....
40C-X-6	A	M-S-P	4	6	8½ x 10½	450-775	700-1100	B-S	....	A	T	....	...	...	...	.....
40C-X-8	A	M-S-P	4	8	8½ x 10½	635-1025	700-1100	B-S	....	A	T	....	...	...	...	.....
6G-825	B	S-P	4	6	10 x 10½	300-600	600-900	..	HM	A	....	....	...	...	...	.....
8G-825	B	S-P	4	8	10 x 10½	400-800	600-900	..	HM	A	....	....	...	...	...	.....
60-6	C	M-S	4	6	12 x 15	410-530	400-514	B	....	A	....	....	...	...	...	.....
60-8	C	M-S	4	8	12 x 15	515-705	400-514	B	....	A	....	....	...	...	...	.....
60X-6	C	M-S	4	6	12 x 15	615-950	400-514	S	....	A	T	....	...	...	...	.....
60X-8	C	M-S	4	8	12 x 15	875-1250	400-514	S	....	A	T	....	...	...	...	.....
65-6	C	M-S	4	6	12¾ x 15	580-720	500-600	S	....	A	....	....	...	...	...	.....
65-8	C	M-S	4	8	12¾ x 15	775-960	500-600	S	....	A	....	....	...	...	...	.....
65X-6	C	M-S	4	6	12¾ x 15	1105-1600	500-600	S	....	A	T	....	...	...	...	.....
65X-8	C	M-S	4	8	12¾ x 15	1470-2150	500-600	S	....	A	T	....	...	...	...	.....
80-6	D	M-S	4	6	14½ x 20	600-780	300-375	S	HM	A	....	....	...	...	...	.....
80-8	D	M-S	4	8	14½ x 20	800-1040	300-375	S	HM	A	....	....	...	...	...	.....
80X-6	C	M-S	4	6	14½ x 20	900-1400	300-375	S	....	A	T	....	...	...	...	.....
80X-8	C	M-S	4	8	14½ x 20	1200-1900	300-375	S	....	A	T	....	...	...	...	.....

* *Continuous HP*

Atlas Engines

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
35-4	A	M-S-P	4	4	6¼ x 8¼	100-110	900-1000	B	....	A-E	....	....	...	...	...	.....
35-6	A	M-S-P	4	6	6¼ x 8¼	150-225	900-1250	B	....	A-E	....	....	...	...	...	.....
35X-6	A	M-S-P	4	6	6¼ x 8¼	225-340	900-1250	B	....	A-E	T	....	...	...	...	.....
45-4	A	M-S-P	4	4	9 x 10½	160-190	600-720	B-S	....	A	....	....	...	...	...	.....
45-6	A	M-S-P	4	6	9 x 10½	240-300	600-750	B-S	....	A	....	....	...	...	...	.....
45-8	A	M-S-P	4	8	9 x 10½	320-400	600-750	B-S	....	A	....	....	...	...	...	.....
45X-6	A	M-S-P	4	6	9 x 10½	360-450	600-750	B-S	....	A	T	....	...	...	...	.....
45X-8	A	M-S-P	4	8	9 x 10½	480-600	600-750	B-S	....	A	T	....	...	...	...	.....
76-6	A	S	4	6	13 x 16	450-500	360-400	B	....	A	....	....	...	...	...	.....
76X-6	A	S	4	6	13 x 16	675-750	360-400	B	....	A	T	....	...	...	...	.....

* *Continuous HP*

White-Roth Machine Corporation—Lorain Engines, Lorain, Ohio

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
L	B	S	2	1	7½ x 8	27	600	..	HM	H-G	....	....	72	50	48	2810
LD	A	S	2	1	7½ x 8	23	600	S	....	G	....	....	72	50	48	2810
O	B	S	2	1	9½ x 10	42	500	..	HM	H-G	....	....	88	60	51	4300
OD	A	S	2	1	9½ x 10	34	500	S	....	G	....	....	88	60	51	4300
R	B	S	2	1	12 x 13	60	350	..	HM	G	....	....	112	71	66	8000
A	B	S	2	1	13 x 13	70	350	..	HM	G	....	....	112	72	66	8300
AD	A	S	2	1	13 x 13	55	350	S	....	G	....	....	112	72	66	8500

* *Continuous HP*

Witte Engine Works, Oil Well Supply Division, U. S. Steel Corporation, Kansas City 26, Missouri

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
AD	A	S-P	4	1	3½ x 4½	4-5.5	1200-1500	B	....	H-E	....	....	24	24	33	450
BD-9	A	S-P	4	1	4¼ x 6	8	900	B	....	H-E	....	....	45	39	42	1150
BD-10	A	S-P	4	1	4¼ x 6	9	1000	B	....	H-E	....	....	45	39	42	1150
CD	A	S-P	4	1	5 x 8	12.5	750	B	....	H-E	....	....	53	49	49	1735
F-28	B	S-P	4	1	8 x 8	28	650	..	HM	E-G	....	....	62	53	54	3000
B-12	B	S-P	4	1	5 x 6	12	1000	..	HM	H-E	....	....	47	39	42	1285
C	B	S-P	4	1	6 x 8	15.5	750	..	HM	H-E	....	....	57	47	49	1760
98	B	S-P	4	1	5 x 5	10	1200	..	HM	H-E	....	....	39	36	36	655
100	A	M-SP	4	2	4 x 4	18.0	1800	B-R	....	E	....	....	29	39	26	700

**Continuous HP*

Worthington Corporation, Harrison, New Jersey

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
SW9-6	D	S-P	4	6	9 x 11	955-1060	900-1000	..	....	A	T	....	...	...	...	.....
SW9-8	D	S-P	4	8	9 x 11	1275-1415	900-1000	..	....	A	T	....	...	...	...	.....
SCC5	D	S	4	5	10¾ x 14½	515	514	..	....	A	T	....	...	...	...	.....
SCC6	D	S	4	6	10¾ x 14½	615	514	..	....	A	T	....	...	...	...	.....
SCC7	D	S	4	7	10¾ x 14½	720	514	..	....	A	T	....	...	...	...	.....
SCC8	D	S	4	8	10¾ x 14½	825	514	..	....	A	T	....	...	...	...	.....
SLHP-4	B	S-P	4	4	11½ x 12	440	514	..	....	A	T	....	...	...	...	.....
SLHP-5	B	S-P	4	5	11½ x 12	550	514	..	....	A	T	....	...	...	...	.....
SLHP-6	B	S-P	4	6	11½ x 12	660	514	..	....	A	T	....	...	...	...	.....
SLHP-8	B	S-P	4	8	11½ x 12	880	514	..	....	A	T	....	...	...	...	.....
SLHP-10	B	S-P	4	10	11½ x 12	1100	514	..	....	A	T	....	...	...	...	.....
SDH-6	D	S-P	4	6	12 x 14	990	600	..	....	A	T	....	...	...	...	.....
SDH-8	D	S-P	4	8	12 x 14	1325	600	..	....	A	T	....	...	...	...	.....
SDR5	D	S	4	5	13¼ x 17¼	1030	450	..	....	A	T	....	...	...	...	.....
SDR6	D	S	4	6	13¼ x 17¼	1235	450	..	....	A	T	....	...	...	...	.....
SDR7	D	S	4	7	13¼ x 17¼	1415	450	..	....	A	T	....	...	...	...	.....
SDR8	D	S	4	8	13¼ x 17¼	1645	450	..	....	A	T	....	...	...	...	.....
SEH5	D	S	4	5	16 x 20	1375	360	..	....	A	T	....	...	...	...	.....
SEH6	D	S	4	6	16 x 20	1650	360	..	....	A	T	....	...	...	...	.....
SEH7	D	S	4	7	16 x 20	1925	360	..	....	A	T	....	...	...	...	.....
SEH8	D	S	4	8	16 x 20	2200	360	..	....	A	T	....	...	...	...	.....
SW14-6	D	S	4	6	14 x 18	1875-2155	450-514	..	....	A	T	....	...	...	...	.....
SW14-8	D	S	4	8	14 x 18	2500-2875	450-514	..	....	A	T	....	...	...	...	.....
SW14-12	D	S	4	12	14 x 18	3750-4315	450-514	..	....	A	T	....	...	...	...	.....
SW14-16	D	S	4	16	14 x 18	5000-5755	450-514	..	....	A	T	....	...	...	...	.....

* *Continuous HP. Increased horsepower is available on some models. Minor variations of bores and strokes can be made for special applications.*

Imported Diesels

Armstrong Siddeley Brockworth Ltd., Hucclecote, Glos., England

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight lb.
6-11HP	A	M-S-P	4	1	4¼ x 4¼	6–11	1000–1800	C	....	H-E	....	....	28	24	33	510
14-22HP	A	M-S-P	4	2	4¼ x 4¼	*4–22	1000–1800	C	....	H-E	....	....	35	24	37	700
20-33HP	A	M-S-P	4	3	4¼ x 4¼	20–33	1000–1800	C	....	H-E	....	....	43	27	39	970

** Maximum continuous HP-12-hr rating. Range of clutches and gears available, also slow running and variable speed controls.*

Burmeister & Wain American Corporation, Mystic, Conn.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.†	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
20MT-30	A	S	4	2-6	7.9 x 11.8	35*	600	O	....	A	....	....	....	....	....	.....
20MTB-30	A	S	4	3-6	7.9 x 11.8	50*	600	O	....	A	T	....	....	....	....	.....
25MT-40	A	S	4	2-7	9.8 x 15.7	60*	500	O	....	A	....	....	....	....	....	.....
25MTB-40	A	S	4	3-7	9.8 x 15.7	85*	500	O	....	A	T	....	....	....	....	.....
33MT-48	A	M-S	4	3-7	13.0 x 18.9	100*	400	O	....	A	....	D	....	....	....	.....
28V-50	A	M-S	2	4-9	11.0 x 19.7	122*	360	O	....	A	....	D††	....	....	....	.....
33MTB-48	A	M-S	4	3-7	13.0 x 18.9	140*	400	O	....	A	T	D	....	....	....	.....
28VB-50	A	M-S	2	5-9	11.0 x 19.7	175*	360	O	....	A	T	D††	....	....	....	.....
35V-62	A	M-S	2	4-10	13.8 x 24.4	200*	300	O	....	A	....	D	....	....	....	.....
42V-75	A	M-S	2	4-10	16.5 x 29.5	240*	240	O	....	A	....	D	....	....	....	.....
35VB-62	A	M-S	2	5-10	13.8 x 24.4	270*	300	O	....	A	T	D	....	....	....	.....
42VB-75	A	M-S	2	5-10	16.5 x 29.5	324*	240	O	....	A	T	D	....	....	....	.....
50V-90	A	M-S	2	4-10	19.7 x 35.4	410*	200	O	....	A	....	D	....	....	....	.....
50VT-110	A	M-S	2	4-10	19.7 x 43.3	420*	170	O	....	A	....	D	....	....	....	.....
50VB-90	A	M-S	2	5-10	19.7 x 35.4	554*	200	O	....	A	T	D	....	....	....	.....
50VTB-110	A	M-S	2	5-10	19.7 x 43.3	567*	170	O	....	A	T	D	....	....	....	.....
74T-150	A	M-S	4	6-10	29.1 x 59.0	575*	120	O	....	A	....	D	....	....	....	.....
50VT-110/40	A	M-S	2	4-10	19.7 x 43.3/15.7	585*	170	O	....	A	....	D	....	....	....	.....
62V-115	A	M-S	2	4-10	24.4 x 45.3	600*	150	O	....	A	....	D	....	....	....	.....
62VT-115	A	M-S	2	4-10	24.4 x 45.3	600*	150	O	....	A	....	D	....	....	....	.....
62VT-140	A	M-S	2	4-12	24.4 x 55.1	655	135	O	....	A	....	D	....	....	....	.....
50VBT-110/40	A	M-S	2	5-10	19.7 x 43.3/15.7	790*	170	O	....	A	T	D	....	....	....	.....
62VB-115	A	M-S	2	5-10	24.4 x 45.3	810*	150	O	....	A	T	D	....	....	....	.....
62VTB-115	A	M-S	2	5-10	24.4 x 45.3	810*	150	O	....	A	T	D	....	....	....	.....
74VT-140	A	M-S	2	4-10	29.1 x 55.1	875*	125	O	....	A	....	D	....	....	....	.....
62VTB-140	A	M-S	2	5-12	24.4 x 55.1	900	135	O	....	A	T	D	....	....	....	.....
74VT-160	A	M-S	2	5-12	29.1 x 63.0	920*	115	O	....	A	....	D	....	....	....	.....
74VTB-140	A	M-S	2	5-12	29.1 x 55.1	1190*	125	O	....	A	T	D	....	....	....	.....
75VT-150/50	A	M-S	2	4-10	29.5 x 59.0/19.7	1230*	120	O	....	A	....	D	....	....	....	.....
74VTB-160	A	M-S	2	5-12	29.1 x 63.0	1250*	115	O	....	A	T	D	....	....	....	.....
75VT-170/60	A	M-S	2	4-10	29.5 x 66.9/23.6	1300*	110	O	....	A	....	D	....	....	....	.....
75VTB-150/50	A	M-S	2	4-10	29.5 x 59.0/19.7	1650*	120	O	....	A	T	D	....	....	....	.....
75VTB-170/60	A	M-S	2	4-10	29.5 x 66.9/23.6	1755*	110	O	....	A	T	D	....	....	....	.....
ALPHA-340	A	M	2	2-4	7.9 x 13.4	50*	450	O	....	A	....	††	....	....	....	.....
ALPHA-400	A	M	2	2-6	9.1 x 15.7	70*	375	O	....	A	....	††	....	....	....	.....
ALPHA-490	A	M	2	4-8	11½ x 19¼	120	310	O	....	A	....	††	....	....	....	.....
BUKH-EV80	A	M-S-P	4	1	3.1 x 4.3	6*	1800	B	....	E-H**	....	....	....	....	....	.....
BUKH-EV100	A	M-S-P	4	1-3	3.9 x 5.1	12*	1800	B	....	E-H**	....	††	....	....	....	.....

*†Continuous HP. *Hp per cylinder. **Also cartridge start. ††Controllable pitch propeller and sailing clutch of own manufacture. On models with dual stroke, shorter stroke is for exhaust piston.*

Curtiss-Wright Corp., Utica Division, 50500 Mound Road, Utica, Mich.
Mercedes-Benz

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
M202B	A	M-S-P	4	2	5.5 x 8.25	55	1200	G	....	A-E-H	....	....	36	31	45	1590
M203B	A	M-S-P	4	3	5.5 x 8.25	90	1200	G	....	A-E	....	....	47	31	46	2160
M204B	A	M-S-P	4	4	5.5 x 8.25	129	1200	G	....	A-E	....	....	57	31	47	2715
OM636	A	M-S-P	4	4	2.938 x 3.938	36–46	3000–3600	G	....	E	....	P	27	23	32	400
OM312	A	M-S-P	4	6	3.563 x 4.75	79–110	2400–3000	G	....	E	....	C	37	26	41	808
OM321	A	M-S-P	4	6	3.75 x 4.75	96–120	2600–3000	G	....	E	....	C	37	26	41	784
OM315	A	M-S-P	4	6	4.438 x 5.5	123–155	1800–2100	G	....	E	....	C	54	27	47	1775
OM315A	A	M-S-P	4	6	4.438 x 5.5	150	1800	G	....	E	T	C	54	28	50	1800
OM326	A	M-S-P	4	6	5.031 x 5.5	158–220	1800–2200	G	....	E	....	C	54	27	47	1800
MB846A	A	M-S-P	4	6	5.875 x 7.5	242	1500	G	....	A-E	....	....	74	31	60	4075
MB846B†	A	M-S-P	4	6	5.875 x 7.5	242	1500	G	....	A-E	....	....	75	52	29	4075
MB846Ab	A	M-S-P	4	6	5.875 x 7.5	320	1500	G	....	A-E	T	....	89	37	62	4298
MB846Bb†	A	M-S-P	4	6	5.875 x 7.5	320	1500	G	....	A-E	T	....	86	61	29	4408
MB846Db	A	M-S-P	4	6	5.875 x 7.5	375	1500	G	....	A-E	T**	....	84	34	62	4266
MB836B	A	M-S-P	4	6	6.875 x 8.063	360	1500	G	....	A-E††	....	....	76	41	55	3560
MB836Bb	A	M-S-P	4	6	6.875 x 8.063	513	1500	G	....	A-E††	T	....	84	41	64	4080
MB836Db	A	M-S-P	4	6	6.875 x 8.063	666	1500	G	....	A-E††	T**	....	90	41	64	4290
MB820B	A	M-S-P	4	V-12	6.875 x 8.063	718	1500	G	....	A-E††	....	....	95	53	73	5510
MB820Db	A	M-S-P	4	V-12	6.875 x 8.063	1026	1500	G	....	A-E††	T	....	95	53	77	6116
MB820Db	A	M-S-P	4	V-12	6.875 x 8.063	1385	1500	G	....	A-E††	T**	....	95	54	73	6612
MB837A	A	M-S-P	4	V-8	6.5 x 6.891	451–475	2000–2200	G	....	E	....	....	49	41	42	2970
MB837Aa	A	M-S-P	4	V-8	6.5 x 6.891	564	2000	G	....	E	M	....	50	41	44	3080

** Intermittent HP. Where HP range is given, the higher hp is maximum rating for automotive applications. ** Highly turbocharged. † Horizontal engine. †† Uses compressed air motor starting.*

The Daimler Co. Ltd., Coventry, England

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight lb.
CD.650	A	P	4	6	5 x 5½	140–150	1800–2000	C†	....	E	....	....	59	27	41	2029
D.650.H	A	P	4	6	5 x 5½	140–150	1800–2000	C†	....	E	....	....	65	25	46	1884

** Maximum HP † Simms injection system is also used.*

Gebr. Eicher Traktorenfabrik, Forstern/Munich, Germany

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	H.P.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
ED1e	A	M-S-P	4	1	4.13 x 5.9	13	1500	†	....	E	....	....	28	27	38	749
ED1	A	M-S-P	4	1	4.33 x 5.9	16	1500	†	....	E	....	....	26	27-31	38-43	827
ED1b	A	M-S-P	4	1	4.33 x 5.9	19	1500	†	....	E	....	....	26	27-31	38-49	827
ED1d	A	M-S-P	4	1	4.52 x 5.9	22	1650	†	....	E	....	....	26	27-31	38-49	827
ED2e	A	M-S-P	4	2	4.13 x 5.9	26	1500	†	....	E	....	....	33	27	45	1091
ED2b	A	M-S-P	4	2	4.33 x 5.9	33	1500	†	....	E	....	....	33	27	55	1102
ED2d	A	M-S-P	4	2	4.52 x 5.9	40	1500	†	....	E	....	....	33	27	55	1102
ED3d	A	M-S-P	4	3	4.52 x 5.9	60	1650	†	....	E	....	....	...	...	...	.....

Engine capacity according to German norm. Stationary service, capacity 10% less. † Deckel

Henschel-Werke GmbH, Kassel, Germany

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
2R1013	A	M-S-P	4	2	4.13 x 5.12	22-27	1800	G	....	E	....	....	28	22	35	605
4R1013†	A	M-S-P	4	4	3.94 x 5.12	66-90	2200-2600	G	....	E	....	....	34	25	38	725
4R1013A†	A	M-S-P	4	4	3.94 x 5.12	75-100	2200-2600	G	....	E	M	....	37	26	40	815
6R1012	A	M-S-P	4	6	3.94 x 4.92	87-115	2200-2400	G	....	E	....	....	44	25	42	1000
6R1013	A	M-S-P	4	6	3.94 x 5.12	96-125	2200-2500	G	....	E	....	....	44	25	42	1040
6U1013**	A	M-S-P	4	6	3.94 x 5.12	96-125	2200-2500	G	....	E	....	....	50	50	18	1080
6R1013A	A	M-S-P	4	6	3.94 x 5.12	110-150	2200-2500	G	....	E	M	....	47	25	43	1140
6U1013A**	A	M-S-P	4	6	3.94 x 5.12	110-150	2000-2500	G	....	E	M	....	50	55	20	1180
6R1115	A	M-S-P	4	6	4.53 x 5.90	114-145	2000-2200	G	....	E	....	....	53	33	44	1330
6U1115	A	M-S-P	4	6	4.53 x 5.90	124-158	2000-2200	G	....	E	....	....	52	49	21	1450
6R1215D	A	M-S-P	4	6	4.92 x 5.90	143-180	1800-2200	G	....	E	....	....	53	28	43	1590
6R1416	A	M-S-P	4	6	5.31 x 6.1	160-200	1600-1800	G	....	A-E	....	....	59	32	51	2430
6U1416**	A	M-S-P	4	6	5.31 x 6.1	160-200	1600-1800	G	....	E	....	....	69	51	29	2430
6R1416A	A	M-S-P	4	6	5.31 x 6.1	212-285	1600-1800	G	....	A-E	T	....	73	32	51	2520
6U1416A**	A	M-S-P	4	6	5.31 x 6.1	212-285	1600-1800	G	....	E	T	....	76	51	29	2520
8V1416	A	M-S-P	4	8	5.31 x 6.1	213-265	1600-1800	G	....	A-E	....	....	53	42	49	3100
8V1416A	A	M-S-P	4	8	5.31 x 6.1	283-380	1600-1800	G	....	A-E	T	....	67	42	49	3700
12V1416	A	M-S-P	4	12	5.31 x 6.1	320-400	1600-1800	G	....	A-E	....	....	70	42	49	4520
12V1416A	A	M-S-P	4	12	5.31 x 6.1	424-570	1600-1800	G	....	A-E	T	....	84	42	49	4680

** Continuous-maximum HP. ** Horizontal Engine. † This model can be obtained as horizontal engine.*

Klockner-Humboldt-Duetz—Diesel Energy Corporation 82 Beaver Street, New York 6, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel† System	Ignition	Start	Super-Charge	Rev. Gear	Length In.††	Width In.††	Height In.††	Weight Lb.††
MAH711	A	M-S-P	4	1	3 15/16 x 4 1/16	6	1500	O	....	H	....	....	31	24	21	374
MAH914	A	M-S-P	4	1	4 1/2 x 5 1/2	11	1500	O	....	H	....	....	39	30	26	693
MAH916	A	S-P	4	1	4 3/4 x 6 5/8	16	1300	O	....	H-A	....	....	44	35	28	957
MAH320	A	S-P	4	1	6 1/4 x 7 7/8	20	1000	O	....	H-A	....	....	55	39	32	1717
T1L110	A	S-P	2	1	3 1/4 x 3 7/8	8	2500	B	....	H	....	....	16	20	25	158
F1-6L712	A**	M-S-P	4	1-4 & 6	3 3/4 x 4 3/4	10-60	200	O-B	....	H-E	....	....	49	28	34	902
A2-6L514	A**	M-S-P	4	2-4 & 6	4 5/8 x 5 1/2	32-84	1800	B	....	H-E	....	....	64	34	40	1606**
BA6L514	A	S-P	4	V-6	4 5/8 x 5 1/2	105	1800	B	....	E	T	....	59	33	41	1739
A6L614	A**	S-P	4	V-6	4 5/8 x 5 1/2	84	1800	B	....	E	....	....	39	46	35	1672
A8L614	A**	M-S-P	4	V-8	4 5/8 x 5 1/2	112	1800	B	....	E	....	....	47	47	35	1981
BA8L614	A	M-S-P	4	V-8	4 5/8 x 5 1/2	140	1800	B	....	E	T	....	53	42	50	2069
A12L614	A**	M-S-P	4	V-12	4 5/8 x 5 1/2	170	1800	B	....	E	....	....	67	48	35	2862
BA12L614	A	M-S-P	4	V-12	4 5/8 x 5 1/2	210	1800	B	....	E	T	....	78	48	38	2972
F2L614	A**	P	4	2-4 & 6	4 5/8 x 5 1/2	32-125	1800-2300	B	....	E	....	....	52	30	42	1211
BF6L514	A	P	4	6	4 5/8 x 5 1/2	150	2300	B	....	E	T	....	59	33	41	1739
F6L614	A**	P	4	V-6	4 5/8 x 5 1/2	125	2300	B	....	E	....	....	39	46	35	1673
F8L614	A**	P	4	V-8	4 5/8 x 5 1/2	170	2300	B	....	E	....	....	47	47	35	1981
BF8L614	A	P	4	V-8	4 5/8 x 5 1/2	200	2300	B	....	E	T	....	53	42	50	2069
F12L614	A**	P	4	V-12	4 5/8 x 5 1/2	250	2300	B	....	E	....	....	67	48	35	2862
BF12L614	A	P	4	V-12	4 5/8 x 5 1/2	300	2300	B	....	E	T	....	78	48	38	2972
A2-8M517	A	M-S-P	4	2, 4, 6 & 8	5 1/4 x 6 5/8	42-170	1500	B	....	E	....	....	130	30	48	3192
BA8M517	A	M-S-P	4	8	5 1/4 x 6 5/8	250	1500	B	....	E-A	T	....	130	30	51	3501
F6M617	A	P	4	6	5 1/4 x 6 5/8	175	1800	B	....	E	....	....	69	30	48	2510
T4M320	A	M-S-P	2	V-4	6 5/16 x 7 7/8	133	800	O	....	A-E	....	....	50	52	51	3413
T8M320	A	M-S-P	2	V-8	6 5/16 x 7 7/8	267	800	O	....	A-E	....	....	80	48	61	4899
T12M320	A	M-S-P	2	V-12	6 5/16 x 7 7/8	400	800	O	....	A-E	....	....	98	48	63	6826
T8M420	A	M-S-P	2	V-8	6 5/16 x 7 7/8	333	1000	O	....	E	....	....	80	48	61	4730
T12M420	A	M-S-P	2	V-12	6 5/16 x 7 7/8	500	1000	O	....	A	....	....	99	48	63	6495
4M425	A	M-S-P	2	4	5 5/16 x 9 7/8	95	600	O	....	A	....	....	73	37	57	6583
T4M625	A	M-S-P	2	V-4	7 7/8 x 9 7/8	240	750	O	....	A	....	D	64	59	68	6826
T6M625	A	M-S-P	2	V-6	7 7/8 x 9 7/8	360	750	O	....	A	....	D	78	59	68	8808
T8M625	A	M-S-P	2	V-8	7 7/8 x 9 7/8	480	750	O	....	A	....	D	89	59	68	10349
T12M625	A	M-S-P	2	V-12	7 7/8 x 9 7/8	720	750	O	....	A	....	D	117	60	68	13652
BT8-12M625	A	M-S-P	2	V-8 & 12	7 7/8 x 9 7/8	670-1000	750	O	....	A	T	D	153	64	93	13652
T12M332	A	M-S-P	2	V-12	9 7/8 x 12 5/8	950	500	O	....	A	....	D	162	71	90	27745
BT12M332	A	M-S-P	2	V-12	9 7/8 x 12 7/8	1300	500	O	....	A	T	D	189	71	104	28626
T8M233	A	M-S-P	2	V-8	8 5/8 x 13	500	500	O	....	A	....	D	111	58	72	15303
BT8M233	A	M-S-P	2	V-8	8 5/8 x 13	700	500	O	....	A	T	D	123	75	98	16515
A4-8M428	A	M-S-P	4	4, 6 & 8	8 5/8 x 11	150-310	600	O	....	A	....	D	130	36	65	14467**
A3&4M528	A	M-S-P	4	3 & 4	8 5/8 x 11	110-150	600	O	....	A	....	D	82	56	75	8808
A6&8M528	A	M-S-P	4	6 & 8	8 5/8 x 11	290-370	750	O	....	A	....	D	139	52	75	14753
BA6&8M528	A	M-S-P	4	6 & 8	8 5/8 x 11	460-620	750	O	....	A	T	D	155	52	96	15414
V6M436	A	M-S-P	4	6	9 5/8 x 14 5/8	360	600	O	....	A	....	D	135	43	76	21579
V6&8M536	A	M-S-P	4	6 & 8	10 5/8 x 14 5/8	450&510	514	O	....	A	....	D	164	43	83	27525**
V6&8M545	A	M-S-P	4	6 & 8	13 x 17 3/4	550 & 660	375	O	....	A	....	D	196	53	94	44040**
BV6&8M536	A	M-S-P	4	6 & 8	10 5/8 x 14 5/8	560 & 800	514	O	....	A	T	D	170	43	108	28515**
BV6&8M545	A	M-S-P	4	6 & 8	13 x 17 3/4	1000 & 1320	375	O	....	A	T	D	201	53	128	43709**
V6&8M358	A	M-S-P	4	6 & 8	15 3/4 x 22 7/8	810-1090	300	O	....	A	....	D	248	45	137	86979
BV6&8M358	A	M-S-P	4	6 & 8	15 3/4 x 22 7/8	1500-2000	300	O	....	A	T	D	248	79	137	86318
V6&8M366	A	M-S-P	4	6 & 8	16 1/2 x 26	915-1210	275	O	....	A	....	D	300	72	142	118027**
BV6&8M366	A	M-S-P	4	6 & 8	16 1/2 x 26	1500 & 2000	275	O	....	A	T	D	276	72	160	119568**

** Continuous HP † B Denotes Robert Bosch Equipment. †† Where range of engines is shown, weights and dimensions are for largest engine in range. In most cases, width and height are the same for all engines in the range. ** Air Cooled.*

Lister-Blackstone, Inc., 420 Lexington Avenue, New York 17, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
LD1	A	M-S	4	1	3 x 3 1/2	3.5	1800	C	....	H-E	....	O	22	19	25	245
LD2	A	M-S	4	2	3 x 3 1/2	7	1800	C	....	H-E	....	O	28	21	28	406
12-2	A	S-P	4	2	4 1/2 x 5 1/2	11.4	650	C	....	H	....	....	51	24	40	1060

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
JP2	A	M-S	4	2	4½ x 5½	23	1200	C	....	H-E	....	O	55	29	42	2034
JP3	A	M-S	4	3	4½ x 5½	35	1200	C	....	H-E	....	O	64	29	42	2496
JP4	A	M-S	4	4	4½ x 5½	46	1200	C	....	E	....	O	88	38	42	3024
JP616	A	M-S	4	6	4½ x 5½	70	1200	C	....	E	....	O	93	34	44	3752
FR1	A	M-S	4	1	3¾ x 4½	9	1800	C	....	H-E	....	O	25	23	36	795
FR2	A	M-S	4	2	3¾ x 4½	18	1800	C	....	H-E	....	O	30	23	36	977
FR3	A	M-S	4	3	3¾ x 4½	27	1800	C	....	H-E	....	O	35	23	36	1164
FR4	A	M-S	4	4	3¾ x 4½	36	1800	C	....	E	....	O	44	23	36	1370
FR6	A	M-S	4	6	3¾ x 4½	54	1800	C	....	E	....	O	54	23	36	1660
TS3	A	M-S	2	3	3¼ x 4†	77	1800	C	....	E	....	C	65	31	29	1330

** BHP quoted is for 12 hour continuous running with 10% overload for 1 hour. † TS3 is a horizontal opposed-piston engine. Multiply stroke per cylinder by 2 to obtain total piston travel.*

Maschinenbau Kiel Aktiengesellschaft, MAK Kiel, Germany

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel† System	Ignition	Start	Super-Charge	Rev. Gear	Length In.††	Width In.	Height In.	Weight Lb.††
MZ582	A	M-S	4	10	15¾ x 22¹³⁄₁₆	1250	300	....	....	A	....	D	335	56	137	103000
MA582	A	M-S	4	8	15¾ x 22¹³⁄₁₆	1000	300	....	....	A	....	D	280	56	137	83700
MS582	A	M-S	4	6	15¾ x 22¹³⁄₁₆	750	300	....	....	A	....	D	226	56	137	65000
MZ582AK	A	M-S	4	10	15¾ x 22¹³⁄₁₆	2000	300	....	....	A	T	D	335	56	137	107000
MN582AK	A	M-S	4	9	15¾ x 22¹³⁄₁₆	1800	300	....	....	A	T	D	305	56	137	100000
MA582AK	A	M-S	4	8	15¾ x 22¹³⁄₁₆	1650	300	....	....	A	T	D	280	56	137	86600
MS582AK	A	M-S	4	6	15¾ x 22¹³⁄₁₆	1250	300	....	....	A	T	D	226	56	137	69000
4Z421	A	M-S	2	4	11³⁷⁄₆₄ x 16³⁷⁄₆₄	500	370–428	....	....	A	....	D	111	48	111	27600
6Z421	A	M-S	2	6	11³⁷⁄₆₄ x 16³⁷⁄₆₄	750	375	....	....	A	....	D	154	48	111	34400
8Z421	A	M-S	2	8	11³⁷⁄₆₄ x 16³⁷⁄₆₄	1000	375	....	....	A	....	D	189	48	111	41200
MV423	A	M-S	4	4	11³⁷⁄₆₄ x 16³⁷⁄₆₄	240–265	340–375	....	....	A	....	D	120	48	93	18050
MS423	A	M-S	4	6	11³⁷⁄₆₄ x 16³⁷⁄₆₄	400–455	375–428	....	....	A	....	D	155	48	93	26500
MA423	A	M-S	4	8	11³⁷⁄₆₄ x 16³⁷⁄₆₄	530–605	375–428	....	....	A	....	D	189	48	93	33800
MS423AK	A	M-S	4	6	11³⁷⁄₆₄ x 16³⁷⁄₆₄	600–690	375–428	....	....	A	T	D	155	48	93	28000
MA423AK	A	M-S	4	8	11³ ³⁷⁄₆₄ x 16³⁷⁄₆₄	800	375	....	....	A	T	D	189	48	93	36800
MD36	A	M-S	4	3	8¹⁵⁄₁₆ x 14³⁄₁₆	90–120	375–500	....	....	A	....	D	84	44	79	7700
MV36	A	M-S	4	4	8¹⁵⁄₁₆ x 14³⁄₁₆	120–160	375–500	....	....	A	....	D	98	44	79	9700
MS36	A	M-S	4	6	8¹⁵⁄₁₆ x 14³⁄₁₆	180–240	375–500	....	....	A	....	D	125	44	79	13650
MS36A	A	M-S	4	6	8¹⁵⁄₁₆ x 14³⁄₁₆	270–360	375–500	....	....	A	T	D	125	44	79	14000
MS301	A	M-S-P	4	6	9¹⁄₁₆ x 11¹³⁄₁₆	360–370	750	....	....	A	....	....	115	35	75	12580
MA301	A	M-S-P	4	8	9¹⁄₁₆ x 11¹³⁄₁₆	480–500	750	....	....	A	....	....	140	35	75	16300
MS301A	A	M-S-P	4	6	9¹⁄₁₆ x 11¹³⁄₁₆	500–600	750	....	....	A	T	....	115	35	75	12670
MS301C	A	M-S-P	4	6	9¹⁄₁₆ x 11¹³⁄₁₆	550–650	750	....	....	A	T	....	115	35	75	13150
MS301CK	A	M-S-P	4	6	9¹⁄₁₆ x 11¹³⁄₁₆	600–750	750	....	....	A	T	....	115	35	75	13230
MA301A	A	M-S-P	4	8	9¹⁄₁₆ x 11¹³⁄₁₆	650–800	750	....	....	A	T	....	140	35	78	16800
MA301C	A	M-S-P	4	8	9¹⁄₁₆ x 11¹³⁄₁₆	720–850	750	....	....	A	T	....	140	35	79	17600
MA301CK	A	M-S-P	4	8	9¹⁄₁₆ x 11¹³⁄₁₆	750–1000	750	....	....	A	T	....	140	35	79	17750
MV24	A	M-S-P	4	4	7⅜ x 9⅞	80–160	500–1000	....	....	A-E	....	....	68	33	57	5730
MS24	A	M-S-P	4	6	7⅜ x 9⅞	120–240	500–1000	....	....	A-E	....	....	88	33	57	7600
MS304	A	M-S	4	6	9¹⁄₁₆ x 11¹³⁄₁₆	360–400	750	....	....	A	....	....	115	35	75	12580
MA304	A	M-S	4	8	9¹⁄₁₆ x 11¹³⁄₁₆	480–540	750	....	....	A	....	....	146	35	75	16300
MS361A†	A	M-S	4	6	8¹⁵⁄₁₆ x 14³⁄₁₆	290–430	375–600	....	....	A	T	....	125	44	79	14500
MS424AK†	A	M-S	4	6	11³⁷⁄₆₄ x 16³⁷⁄₆₄	600–690	375–428	....	....	A	T	....	145	48	98	22400
MA424AK†	A	M-S	4	8	11³⁷⁄₆₄ x 16³⁷⁄₆₄	800–920	375–428	....	....	A	T	....	180	48	98	40700
4Z&8Z2421AK	A	M-S	2	4 & 8	11³⁷⁄₆₄ x 16³⁷⁄₆₄	700–1400	375	....	....	A	T	....	189	48	111	41200

** Continuous-maximum HP. † This model can be obtained without turbocharging. †† Length and weight without flywheel.*

Maschinenfabrik-Augsburg-Nuernberg A. C., American M•A•N Corp., 149 Broadway, New York 6, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
D0022m	A†	M-S-P	4	2	3.94 x 4.92	12.5–22	1000–1800	G	....	A-E	....	....	24	29	37	770
D0024m	A†	M-S-P	4	4	3.94 x 4.92	27–45	1000–1800	G	....	A-E	....	....	35	32	37	1030
D0026m	A†	M-S-P	4	6	3.94 x 4.92	42–68	1000–1800	G	....	A-E	....	....	44	27	43	1180
D1246m	A†	M-S-P	4	6	4.41 x 5.51	60–90	1000–1800	G	....	A-E	....	....	47	28	45	1520
D1548m	A†	M-S-P	4	8	4.53 x 5.51	80–140	1000–1800	G	....	A-E	....	....	45	47	49	2000
D1548mT	A†	M-S-P	4	8	4.53 x 5.51	95–165	1000–1800	G	....	A-E	T	....	45	56	53	2400
WV14/18	D	M-S-P	4	4 & 6	5.51 x 7.08	55–180	750–1500	G	....	A-E	....	....	45&62	25	46	.....
WV14/18mA	A	M-S-P	4	6	5.51 x 7.08	165–275	1000–1500	G	....	A-E	T	....	73	25	50	4300
WV17.5/22A	D	M-S-P	4	3–6, 8	6.89 x 8.66	64–280	600–1000	G	....	A-E	....	....	44-98	32	53-57	.....
WV17.5/22AmA	A	M-S-P	4	6 & 8	6.89 x 8.66	220–445	720–1000	G	....	A-E	T	....	93&115	32	55&63	.....
WV22/30A	A	M-S-P	4	6 & 8	8.66 x 11.81	250–520	600–900	G	....	A-E	....	....	98&122	30	74	.....
WV22/30AmA	A	M-S-P	4	6 & 8	8.66 x 11.81	395–450	600–900	G	....	A-E	T	....	98&122	30	75&78	.....
VV22/30	A	M-S-P	4	12 & 16	8.66 x 11.81	500–1040	600–900	G	....	A-E	....	....	....	....	....	.....
VV22/30mA	A	M-S-P	4	12 & 16	8.66 x 11.81	790–1900	600–900	G	....	A-E	T	....	....	....	....	.....
WV30/38	A	M-S	4	6,8,10&12	11.81 x 14.96	500–1440	500–700	O	....	A	....	D	....	....	....	.....
WV30/38AmA	A	M-S	4	6,8,10&12	11.81 x 14.96	800–2300	500–700	O	....	A-E	T	D	....	....	....	.....
L12V18/21	A	M-S-P	4	12	7.1 x 8.27	390–700	1000–1500	G	....	A-E	....	....	81	54	70	8000
L12C18/21mA	A	M-S-P	4	12	7.1 x 8.27	570–1250	1000–1500	G	....	A-E	T	....	86	54	81	8600
GV23.5/33	D	M-S	4	3–8	9.25 x 12.99	105–440	360–600	O	....	A	....	D	....	....	....	.....
GV23.5/33mA	D	M-S	4	6–8	9.25 x 12.99	310–685	360–600	O	....	A	T	D	....	....	....	.....
GV30/45	D	M-S	4	3–9	11.81 x 17.71	160–790	250–428	O	....	A	....	D	....	....	....	.....
GV30/45mA	D	M-S	4	6–9	11.81 x 17.71	475–1170	250–428	O	....	A	T	D	....	....	....	.....
GV40/60	D	M-S	4	6–10	15.75 x 23.62	640–1430	225–300	O	....	A	....	D	....	....	....	.....
GV40/60mA	D	M-S	4	6–10	15.75 x 23.62	1020–2280	225–300	O	....	A	T	D	....	....	....	.....
GV52/74A	D	M-S	4	6–10	20.47 x 29.13	1110–2500	188–250	O	....	A	....	D	....	....	....	.....
GV52/74AmA	D	M-S	4	6–10	20.47 x 29.13	1770–4000	188–250	O	....	A	T	D	....	....	....	.....
KV45/66mHA	A††	M-S	4	6–8	17.71 x 25.98	1800–3730	214–250	O	....	A	T***	D	....	....	....	.....
GZ52/70	A	M-S	2	5–10	20.47 x 27.56	1620–4250	187–250	O	....	A	....	D	....	....	....	.....
GZ52/90	A	M-S	2	5–10	20.47 x 35.43	1385–4100	125–187	O	....	A	....	D	....	....	....	.....
KZ57/80	A††	M-S	2	5–10	22.44 x 31.50	2200–6360	187–225	O	....	A	....	D	....	....	....	.....
KZ57/80mC	A††	M-S	2	6–10	22.44 x 31.50	3300–8000	187–225	O	....	A	T	D	....	....	....	.....
KZ60/105C	A††	M-S	2	5–10	23.62 x 41.34	2160–6800	125–167	O	....	A	....	D	....	....	....	.....
KZ60/105mA	A††	M-S	2	6–10	23.62 x 41.34	3240–8480	125–167	O	....	A	T	D	....	....	....	.....
KZ70/120	A††	M-S	2	4–10	27.56 x 47.24	2350–7000	110–130	O	....	A	....	D	....	....	....	.....
KZ70/120mC	A††	M-S	2	6–10	27.56 x 47.24	4590–9050	110–130	O	....	A	T	D	....	....	....	.....
KZ78/140	A††	M-S	2	6–10	30.70 x 55.10	4440–9200	95–118	O	....	A	....	D	....	....	....	.....
KZ78/140C	A††	M-S	2	6–10	30.70 x 55.10	5760–12000	95–118	O	....	A	T	D	....	....	....	.....
KZ78/155	A††	M-S	2	8–10, 12	30.70 x 61.02	6600–12000	95–115	O	....	A	....	D	....	....	....	.....
KZ78/155C	A††	M-S	2	8–10, 12	30.70 x 61.02	8650–15600	95–115	O	....	A	T	D	....	....	....	.....
KZ84/160C	A††	M-S	2	8–10, 12	33.07 x 62.99	10500–20000	95–115	O	....	A	T	D	....	....	....	.....
DZ53/80	A**	M-S	2	4–10	20.87 x 31.50	2855–8100	188–214	O	....	A	....	D	....	....	....	.....
DZ60/110	A**	M-S	2	5–10	23.62 x 43.31	3510–8550	105–130	O	....	A	....	D	....	....	....	.....
DZ72/120	A**	M-S	2	5–10	28.34 x 47.24	5000–12450	95–120	O	....	A	....	D	....	....	....	.....

** Continuous HP. *** Highly Turbocharged. ** Double acting. † "Whisper" Engine, multi-fuel use (With MAN Patented Silent Combustion Principle)" †† Cross head.*

Napier Engines Inc., Subsidiary of D. Napier & Son, Ltd., 909 Dupont Circle Bldg., Washington 6, D.C.

Model†	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.††	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
9-26B&C	A	M-S-P	2	9	5½ x 7¼	860	1500	..	....	A	....	O	76	44	90	6900
9-26K	A	M	2	9	5½ x 7¼	825	1500	..	....	A	....	O	101	44	90	9300
T9-29	A	S-P	2	9	5½ x 7¼	1150	1600	..	....	A	T	....	86	44	90	7500
18-25C	A	S-P	2	18	5½ x 7¼	1725	1500	..	....	A	....	....	101	44	90	10500
18-25K&39K	A	M	2	18	5½ x 7¼	1650–1875	1500–1700	..	....	A	....	O	127	44	90	13300
T18-27C	A	S-P	2	18	5½ x 7¼	2300	1600	..	....	A	T	....	122	44	90	10800
T18-27K&37K	A	M	2	18	5½ x 7¼	2100–2400	1600–1800	..	....	A	T	O	153	44	90	13700

** Continuous HP † All models are of the "Deltic" 2-cycle opposed piston design. †† Multiply stroke by 2 because of opposed piston design.*

F. Perkins (Canada) Limited, 60 Wingold Avenue, Toronto 19, Ontario, Canada

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
P3	A	M-P	4	3	3½ x 5	28.25	1800	C	....	E-H	....	†	22	23	36	500
P4	A	M-S-P	4	4	3½ x 5	28.5	1800	C	....	E	....	††	25	24	33	526
P6	A	M-S-P	4	6	3½ x 5	57.5	1800	C	....	E	....	S	34	24	37	734
L4	A	M-S-P	4	4	4¼ x 4¾	53	1800	C	....	E	....	S	32	22	37	660
R6	A	S-P	4	6	4 x 4½	67	1800	C	....	E	....	....	39	23	40	906
S6	A	S-M	4	6	4¾ x 5	89	1800	C	....	E	....	S	41	31	41	1100
4/99	A	S-M-P	4	4	3 x 3½	27.75	2500	C	....	E-H	....	C	27	19	24	456

** Continuous HP. †Parsons. †† Self Change.*

Petter Engine Division of Brush ABOE Inc., 60-70 39th Avenue, Woodside 77, New York

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
PAZ1**	A	S-P	4	1	3 x 3	3	1800	***	....	H	....	....	28	18	26	265
AVA1**	A	M-S-P	4	1	3.15 x 4.32	6	1800	***	....	E-H	....	†	30	21	30	425
PH1**	A	M-S-P	4	1	3.44 x 4.33	7.5	1800	***	....	E-H	....	†	30	21	30	428
AVA2**	A	M-S-P	4	2	3.15 x 4.33	12	1800	***	....	E-H	....	†	37	21	32	593
PH2**	A	M-S-P	4	2	3.44 x 4.33	15	1800	***	....	E-H	....	†	37	21	32	598
PC1**	A	M-S-P	4	1	3 x 3	5	3000	***	....	E-H	....	†	28	17	28	258
PC2**	A	M-S-P	4	2	3 x 3	10	3000	***	....	E-H	....	†	18	21	30	344
PC3**	A	M-S-P	4	3	3 x 3	15	3000	***	....	E	....	†	23	22	31	447
PC4**	A	M-S-P	4	4	3 x 3	20	3000	***	....	E	....	†	29	22	31	511
PD2**	A	M-S-P	4	2	4.5 x 4.33	24	1800	***	....	E-H	....	††	33	27	35	1020
PD3**	A	M-S-P	4	3	4.5 x 4.33	36	1800	***	....	E-H	....	††	40	27	35	1160
PD4**	A	M-S-P	4	4	4.5 x 4.33	48	1800	***	....	E-H	....	††	46	27	35	1330
PDV6**	A	M-S-P	4	6	4.5 x 4.33	72	1800	***	....	E	....	††	41	45	35	1680
PDV8**	A	M-S-P	4	8	4.5 x 4.33	96	1800	***	....	E	....	††	48	45	35	1990
AV1	A	M-S-P	4	1	3.15 x 4.33	6	1800	***	....	E-H	....	†	30	21	31	402
PH1W	A	M-S-P	4	1	3.44 x 4.33	7.5	1800	***	....	E-H	....	†	34	21	33	408
AV2	A	M-S-P	4	2	3.15 x 4.33	12	1800	***	....	E-H	....	†	37	21	32	572
PH2W	A	M-S-P	4	2	3.44 x 4.33	15	1800	***	....	E-H	....	†	41	21	34	579
B2	A	M-S-P	4	2	4.33 x 4.33	20	1500	***	....	E-H	....	††	47	23	40	987
B3	A	M-S-P	4	3	4.33 x 4.33	36	1800	***	....	E-H	....	††	54	23	40	1372
B4	A	M-S-P	4	4	4.33 x 4.33	48	1800	***	....	E-H	....	††	61	23	40	1456

** Continuous HP. ** Air Cooled. *** Bryce. † Morris. ††Parsons.*

Sulzer Bros., Ltd., New York, 50 Church Street, New York 7, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
BA22	C	S	4	3–8	8.67 x 12.6	200–600	500–600	O	....	A	T	....	...	...	...	.....
BA29	C	S	4	6–8	11.4 x 14.4	700–950	500	O	....	A	T	....	...	...	...	.....
BA36	A	S	4	8	14.4 x 28.6	2000	425	O	....	A	T	....	...	...	...	.....
T24	A	M	2	4&6	9.46 x 15.75	300&450	400	O	....	A	....	O-D	...	...	...	.....
T29	A	M	2	4–9	11.4 x 19.75	400–900	300	O	....	A	....	D	...	...	...	.....
T36	C	M-S	2	4–10†	14.4 x 23.6	600–1600	250–300	O	....	A	....	D	...	...	...	.....
T48	C	M-S	2	4–12††	18.9 x 27.5	1400–4200	225–250	O	....	A	....	D	...	...	...	.....
T56	A	M	2	5–8	22.1 x 39.4	2000–3200	155	O	....	A	....	D	...	...	...	.....
SAD60	A	M	2	4–12	23.6 x 41	.....	150	O	....	A	T	D	...	...	...	.....
SAD72	A	M	2	4–12	28.3 x 49.3	.....	125	O	....	A	T	D	...	...	...	.....
SF72	C	S	2	6–12	28.3 x 35.4	4500–9000	187	O	....	A	....	....	...	...	...	.....
LDA19	A	P	4	6	7.5 x	420	1100	O	....	E	T	....	...	...	...	.....
LDA22	A	P	4	6	8.67 x	570	950	O	....	E	T	....	...	...	...	.....
LDA25	A	P	4	6 & 8	9.85 x	735 & 960	850	O	....	E	T	....	...	...	...	.....
LDA28	A	P	4	6, 8 & 12	11.0 x	920–2350	750 & 935	O	....	E	T	....	...	...	...	.....
RSD58	A	M	2	4–12	22.8 x 29.9	2080–6240	240	O	....	A	T	D	...	...	...	.....
RSAD76	A	M	2	4–12	29.9 x 61	5200–15600	119	O	....	A	T	D	...	...	...	.....
RSAD90	A	M	2	6–12	35.5 x 61	12000–24000	119	O	....	A	T	D	...	...	...	.....

** Continuous HP. † 4 to 8 for stationary. †† 5 to 12 for marine.*

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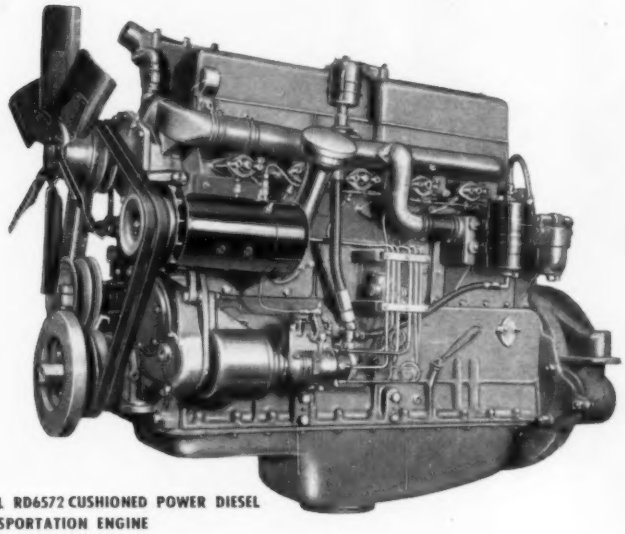

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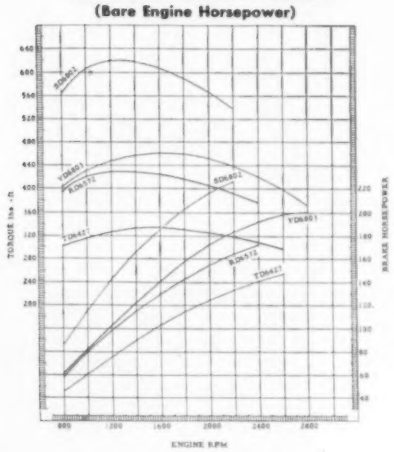

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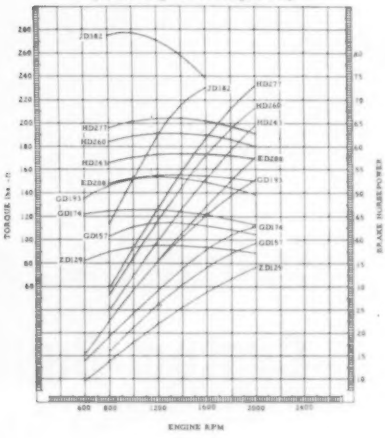

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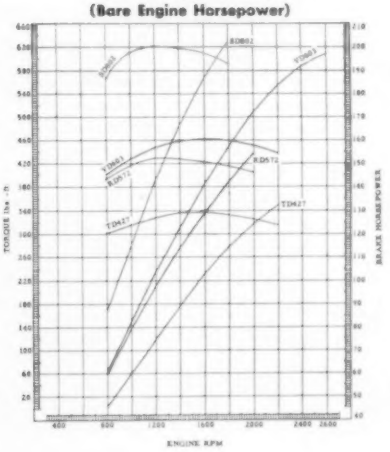

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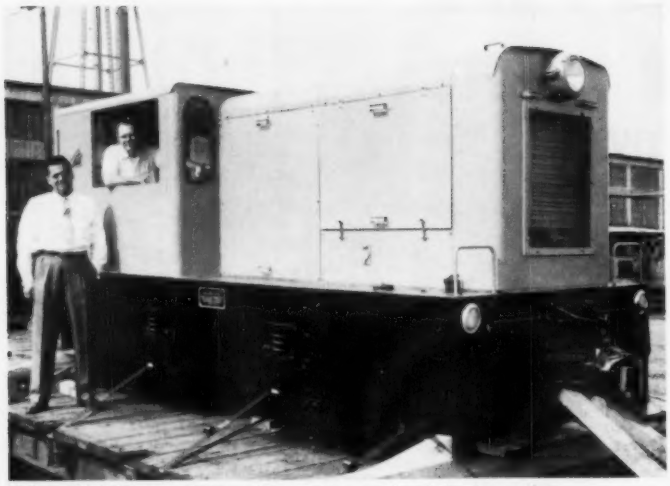
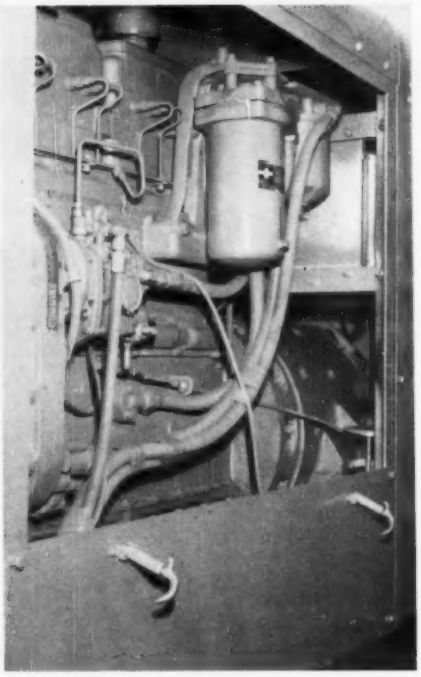


Model RLS-4 Rogers 10-ton, diesel-electric, custom-built locomotive has top speed of 22 mph. It is 204-in. long, 87-in. high and 69-in. wide. It has a wheel base of 58 in. and runs on 30-in. gage track. Sectional engine hood covering diesel and radiator is removable.



Part of 110-hp, 4-cyl Cummins Model HRC-4-BI is seen when hood side plate is removed. Side plate at right, next to cab, and two similar plates on the other side of engine can be also removed making the unit and all accessories easily accessible for servicing.

Industrial Locomotive Custom-Built For Job

Small custom-built locomotives must frequently have the same quality features found in large road locomotives plus special features to suit the customer's application.

CUSTOM-BUILT locomotives must incorporate all features specified by the customer. This often poses complicated design problems. For example, the following were limitations imposed by the International Nickel Co., Ontario, when they ordered three locomotives from the Rogers Bros. Corp., for indoor-outdoor operation in one of their large smelters. The Model RLS-4, 10-ton diesel-electric, 22-mph locomotive had to be made according to these special specifications.

1. The diesel, electrical transmission and other equipment must be serviceable from the common-equipment pool maintained to service their larger locomotives.

2. Diesel exhaust must be conditioned and diluted so as not to be injurious to personnel.

3. Maximum locomotive height must be 87-in. and width 69-in.

4. Although wheel gage is 30-in., locomotive must be stable while pulling fully-loaded cars around 20-ft curve.

5. Since locomotive must run from heated building to outside sub-zero ambient in winter, its water temperature control system must be dependable and automatic.

To meet these requirements, Rogers Bros. selected a Cummins HRC-4-BI diesel loading into a General Electric GT-1519 traction generator and GE-763 traction motor.

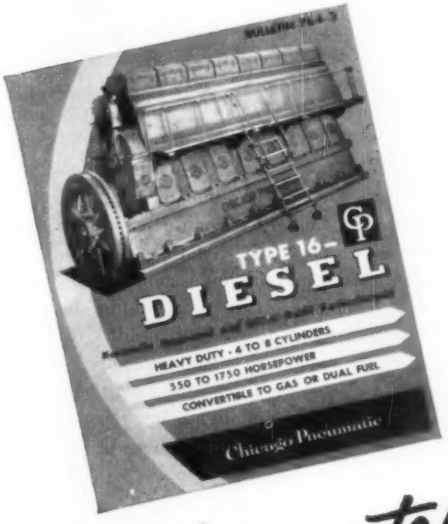
According to A. H. Hoffer, chief engineer, the 4-cycle engine to be selected in this application had to be capable of thorough combustion, converting fuel to a maximum of carbon dioxide, thus producing a minimum of oxides of carbon and nitrogen. To remove unburned carbon and eye-irritating aldehydes, raw exhaust is fed through a specially-designed, 40-gal, water-type stainless-steel scrubber and separator. The scrubber intimately mixes raw exhaust and water to remove aldehydes and unburned carbon. The separator removes contaminated water from the exhaust and returns it to the scrubber tank so that only dry exhaust is released. The cooling system has a suction-type fan so that the radiator discharge can be used for exhaust gas dilution.

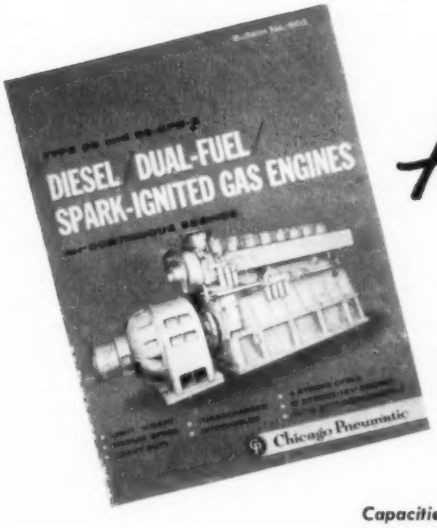
The 4-cyl, 5⅛ x 6-in. bore and stroke, 495-cu in. displacement diesel has a maximum rating of 110 hp at 1800 rpm. However it is only applied at 90 hp at 1800

DIESEL
DUAL-FUEL
NATURAL GAS
SEWERAGE GAS

ENGINES

FOR INDUSTRY AND MUNICIPALITY





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Capacities: **120 to 3000 H. P.**
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rpm to assure a higher air-to-fuel ratio and minimum carbon monoxide.

Heavy-duty oil bath air cleaners are used on both the air intake and crank case breather. Both fuel and lube oil filters are of the full-flow type with replaceable cartridges.

For operation and stand-by in extremely low temperatures, the engine uses a 1000-w Kim Hotstart hot water heater which can be plugged into any standard 110-v power supply. Engine water temperature is automatically controlled by a Kysor Shutterstat. It is preset to hold water temperature at about 170°F. A Perfex radiator features a large heat transfer area and a reserve capacity top tank. The radiator is made of standard components and bolted directly to the main frame. Only a change in core would be required to adopt it to other locomotives in the line.

Starting power is obtained from a 32-v battery and the engine drives a 37-v, 20-amp Leece-Neville battery charging generator. The main traction generator has a starting winding to allow it to act as a series starting motor when so required. The traction generator is bolted directly to the engine and the entire combination is vibration-mounted on a 3-point suspension.

Since the electrical equipment could easily power a 25-ton locomotive and there is considerable safety margin in this application, conventional electrical transition was eliminated. A permanent setting of the field shunting resistor was made thus eliminating a number of relays and contactors and reducing maintenance to a bare minimum.

While the locomotive is equipped with hand operated brakes, it is designed so that air-operated brakes could be easily applied.

In nearly every respect, this locomotive has the quality features generally found only in large road locomotives.

Exhaust gas is fed through specially-designed, 40-gal, water-type stainless steel scrubber and separator to remove aldehydes and unburned carbon.

Clark's New Dozer – It's Most Powerful

THEIR most powerful dozer is now available from the Construction Machinery Div. of Clark Equipment Co. The new 600-hp "Michigan" Model 480 rubber-tired unit has just completed extensive field testing on the Illinois Tollway project.

The 27-ft long, 14-ft wide, 11-ft, 8-in. high 104,000-lb unit has a top speed of 28 mph, both forward and reverse. It is powered by a 12-cyl, 5⅛-in. bore by 6-in. stroke, 2100 rpm, VT-12 Cummins turbocharged diesel.

According to C. E. Killebrew, Clark vice president, it can push-load the largest scraper now used. A high hp-to-weight ratio permits fast acceleration, high speeds and short cycle times.

Tests proved that when push-loading with the Model 480, material packs into the scraper bowl at about one pay yard a second in good working conditions. In tougher loading, such as sand, it is reported to match pushing ability of today's largest crawler working in topsoil.

One reason for the unit's fast-loading ability, is its 600-hp engine. Another is its torque converter drive. The converter automatically matches the 480's power output to loading demands. If the scraper starts to bog down, the dozer automatically delivers more push. If the scraper tries to run away from the dozer in easy going, the converter automatically matches the 480's power output to the increased speed.

Its 4-speed power-shift transmission and torque converter drive makes it easy to handle. No special operator is required. Without foot-clutching, the operator simply moves easy-throw levers to change speed or direction.

The Model 480 is an extension of the Michigan line of construction equipment into the 400 series, all 600-hp machines. It has all the job-proven features of the 180, 280 and 380 dozers.

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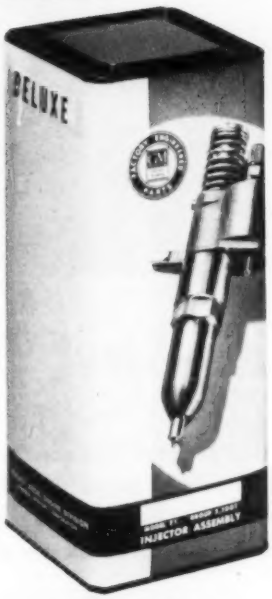

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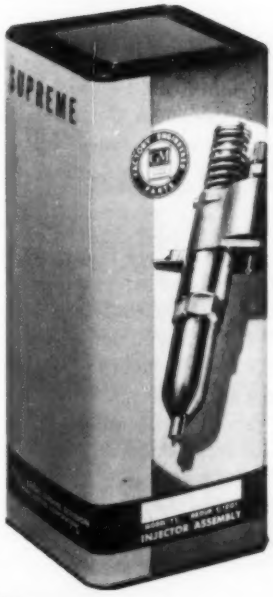

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It stands to reason that the company that sells more GM Diesel Engines and parts knows more about your demands for quality and good service from your injectors. Phone, wire, write today.

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THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES

One of three EMD diesel - electric mobile power cars which supplied power 24 hr per day 7 days per week for the first 6 months of project work. These 1000-kw sets now act as standby units since 9 more of them were installed permanently in a powerhouse.

Mobile Units - First On The Job

You need power in the first stage of any construction project and particularly in remote areas. Immediate power supplied by versatile mobile units cuts costs, speeds construction and makes living more comfortable.

IT takes power to build for more power. This is especially true when the power project is as big as that to be built at Chute des Passes on the upper Peribonka River in Quebec. The $150-million Aluminum Co. of Canada, Ltd. project will have a 1-million-hp installed capacity. It will have what is believed to be the five largest hydroelectric units in the world.

The project involves construction of a 6-mi long, 34-ft high, 34-ft wide horseshoe-shaped supply tunnel; a 1½-mi, 48-ft tailrace tunnel; underground power house; and permanent housing facilities. All this on a site 150 miles from the nearest railhead and transmission lines. The need for immediate power for camp lighting and heating, and for operation of electrically-driven heavy equipment such as compressors and shovels on this project was very urgent. This need was filled quickly and reliably by mobile power.

Quick availability, transportation and set up of a power source such as this avoids the many difficulties, discomforts, time loss and waste of money generally occurring during a project's early stages due to building up a base of operations from scratch. For example, the initial power source in this case were three Electro-Motive Div. of General Motors diesel-electric mobile power cars. These were supplying power within a few weeks. For 6 months these units operated 24-hr a day, seven days a week at full capacity and sometimes even higher.

Their capacity was sufficient to satisfy power needs during the early stage of the project. But to keep pace with the increasing amount of equipment and work force, more power was needed. Nine stationary GM diesel-electric sets filled this need. These were housed in a powerhouse consisting essentially of a concrete foundation and sheet metal siding with an outdoor switch-gear yard. When the powerhouse went into operation, the mobile units were put on a standby basis.

Design and Operation

All 12 units installed at Chute des Passes are essentially of the same basic design — standard packaged units available "off-the-shelf". Output capacity of each unit is 1000 kw at 0.8 pf. An EMD model 16-567C diesel engine drives a 1250 kva, 720 rpm, 60-cycle, 2400/4160 v, 3-phase, a-c generator.

The difference between the three mobile units and nine stationary sets is simply in packaging of components, mounts used, etc. However, one of the mobile units is fully automatic. It can be started and stopped remotely; automatically synchronized; and started and shut down automatically on a predetermined schedule. In case of difficulties such as engine overheating or low oil pressure, all units shut down automatically.

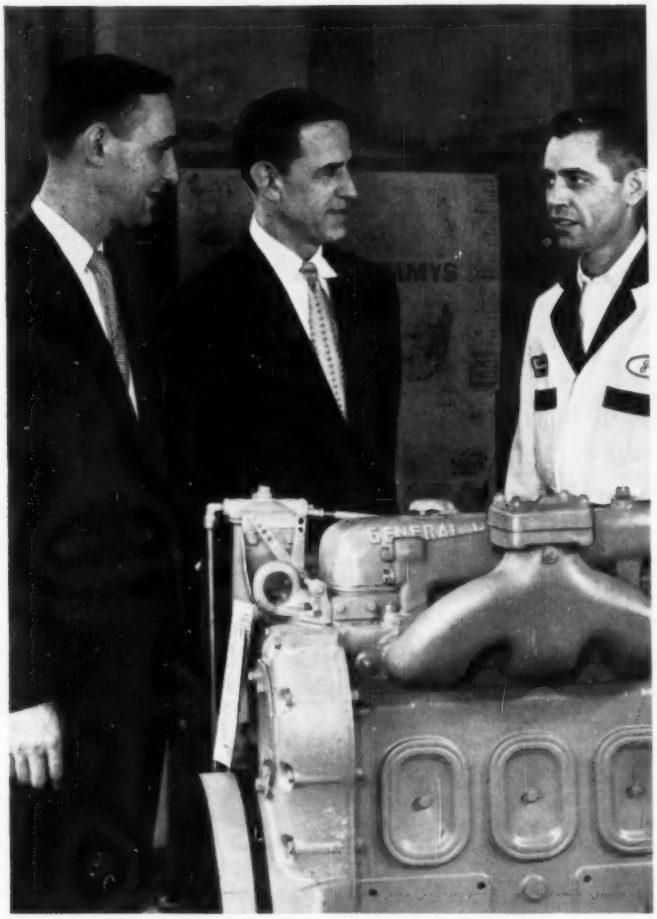
When mobile units were in full operation, each had an operator and an assistant. Capacity of the fuel tanks is enough to keep the engines running at full load for 24 hours. The tanks were refilled once a day by gravity feed. At full load, fuel consumption is about 66 gph.

Maintenance required is strictly routine — 72-hr and 2000-hr inspections and an oil and filter change at 1500 hours. Repairs have been nil — even for the heavily used mobile units. Due to ease of operation and simple construction of the units, it has been easy to train local labor to operate them.

Because of advantages gained on the project through early availability of adequate power, the sets have more than paid for their $100 per kw cost. Proof of the pudding is the fact that the contractor is planning to use this type of equipment on future projects.

Three Managers of Detroit's Peninsular Diesel, Inc., Agree:

"Good service means using factory-recommended tools"



Shown talking sales and service at Peninsular Diesel are, from left to right, Clarke Andrae, Charles Rossow and Joe Lackey.

"Good service is good business," says Clarke Andrae, General Manager of this high-volume GM Diesel distributorship, "and good service means using factory-recommended tools to meet rigid Detroit Diesel specifications."

Adds Sales Manager Charles Rossow, "More and more, good service and service facilities play an important part in diesel sales."

"I couldn't run my service department without the proper tools as recommended by the engine manufacturer." —Joe Lackey, Service Manager.

You'll find that you can turn present GM Diesel service problems into your best salesmen—with Kent-Moore factory-recommended Precision Tools.

There are nearly 200 Kent-Moore Special Service tools for GM Diesel engines, and because every time-saving, labor-saving service kit, gauge and single tool is engineered in cooperation with the engine manufacturer, you can guarantee every job serviced to factory "specs".

See your GM Detroit Diesel Distributor, or write today for your FREE Service Tool Guide listing basic engine tools, and tools for cylinder head, air intake, exhaust and fuel systems, governor and transmission servicing on GM Diesel Series 51, 71 and 110 engines.

KENT-MOORE
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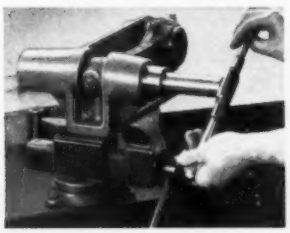
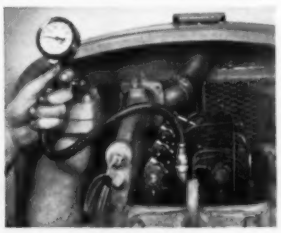
58-D1 ENGINEERS AND MANUFACTURERS OF SERVICE TOOLS AND EQUIPMENT

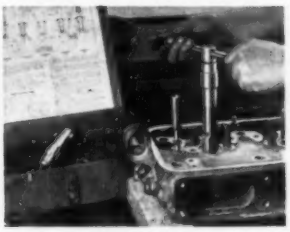
Some typical Kent-Moore Special Service Tools used for factory-recommended GM Diesel service at Peninsular Diesel, Inc., Detroit:



CONNECTING ROD BUSHING REAMER SET



CYLINDER COMPRESSION GAUGE



INJECTOR TUBE SERVICE SET

VALVE SEAT INSERT REMOVER

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Sets a New High in Diesel Shaft Re-Grinding at a NEW LOW PRICE!

1 A great, new Heavy Duty Grinder, at a sensationally new low cost, with the range to re-grind Diesel Shafts up to 84" long... a 22" swing over centers. A range not previously encompassed, except by larger or much more costly machines! Constant alignment, vibrationless operation, greatly reduced set-up time.

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3 This modern Grinder will save you many hundreds of dollars in your service shop, yet you can actually put it to work for only a few dollars a day on an easy payment, Pay-As-You-Depreciate Plan. Van Norman Automotive Equipment Company, Springfield 7, Mass., U.S.A. A Division of Van Norman Industries, Inc.

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INSTANTANEOUS POSITIONING OF HEAD OR FOOTSTOCK TO ACCOMMODATE SHAFTS OF ANY LENGTH UP TO 84"

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UNIT TYPE WHEEL HEAD SPINDLE

3 WORKHEAD SPEEDS 20-40-60 RPM

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Write Get the whole cost reducing story on this great, new No. 467 Grinder NOW!

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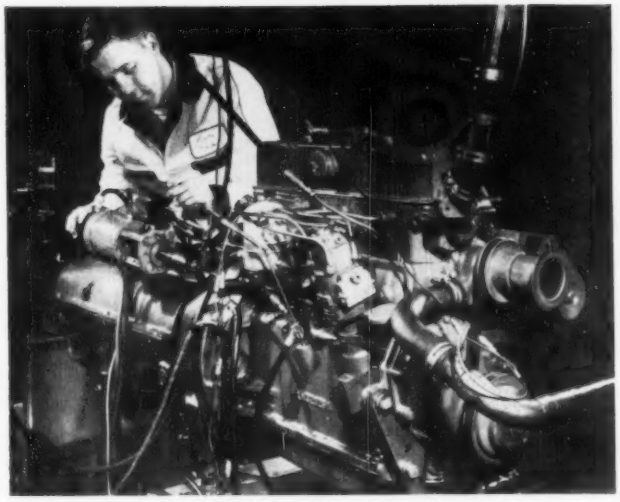
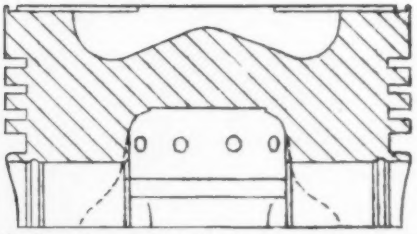




Configuration of Ford diesel engine piston shows "Mexican-hat" shaped recess in crown which holds most of clearance volume when piston is at top dead center. Combustion chamber is of the open type.

Ford's new tractor diesel undergoes endurance tests. This unit has maximum parts interchangeability with high-production Ford gasoline tractor engine.

Ford Develops Diesel For Farm Tractor

Higher production means lower unit cost. Knowing this, Ford planned the design of their new tractor diesel around maximum use of components of a high-production gasoline engine model. Result—minimum premium for diesel advantages.

FORD is now building diesel tractors. Seven models in two different series of tractors are already available. There is one for every corresponding gasoline engine-driven model. Their new Series 801 utility and all-purpose diesel tractors include Models 821, 841, 851, and 861. The Series 901 diesel tractors which are of the row-crop type, are offered with three optional front suspensions—single wheel, dual wheel and adjustable front axle.

Series 801 models differ mainly in size of clutch; number of speeds in transmission; use of power steering; use of power adjusted wheels; and use of a live power take-off. The same diesel engine is used in all of these models.

Ford's major objective when designing these units was to bring all benefits of a diesel tractor to a greater number of users. This was to be done by lowering the premium price paid for a diesel tractor compared to equivalent gasoline models. This was done by narrowing the price-spread between diesel and gasoline tractors. The smaller this difference, the more easily it can be amortized. Thus even farmers getting limited use from their equipment can justify diesel tractor ownership and enjoy its benefits.

They've accomplished this. Retail prices of these new units will be only about $395 more than that of their equivalent gasoline engine-driven tractors. This is much less than the normal premium paid for diesel tractors. These lower prices will be very attractive sales-wise since the lower premium price can be amortized in a shorter time and thereafter real savings—with diesel performance—can be realized.

Credit for this feat goes to Ford's first American-made diesel engine. The cost break-through was brought about by redesigning some components of the high-volume production "Red Tiger" Ford gasoline engine so that many of its parts could be used for the diesel. The economies of the resulting volume production are being passed on to the user.

To adapt the Ford "Red Tiger" engine to diesel use, heavier aluminum pistons were designed and equipped with five rings. A balanced forged steel crankshaft, new connecting rods and other special parts were designed. The overhead valve type cylinder head was redesigned to accommodate fuel nozzles and larger passages for intake air and exhaust gases. It was also strengthened to withstand the pressure requirements of the diesel engine. Compression ratio is now 16 to 1 giving a compression pressure of 365 to 400 psi at 150 rpm cranking speed.

A bore and stroke of 3.9-in. by 3.6-in. gives the 4-cyl, 4-cycle engine a displacement of 172 cu in. It is 34.21-in. long, 16.375-in. wide, 27.21-in. high and weighs 565 lb.

Series 901 Ford diesel-powered farm tractors of the row-crop type are offered with three optional front suspensions: the dual-wheel type shown; single wheel; and adjustable front axle.

Total weight of the diesel tractor is only about 100 lb more than the corresponding gasoline engine model.

Belt horsepower rating of the diesel varies depending on which of the four models of the 801 Series or three Models of the 901 Series tractors it is installed. With a 5-speed transmission, its belt hp rating is 40 at 2200 rpm. With a 4-speed transmission it has a belt hp rating of 37 at 2000 rpm. Drawbar hp for both 4- and 5-speed transmission is 35 at 2000 rpm.

The injection pump is a Roosa-Master distributor type. This self-contained unit which includes the engine governor is mounted vertically on the engine block and driven from the engine camshaft. It delivers fuel directly into the combustion chamber through Simms 4-orifice injectors. These spring-loaded nozzles are mounted diagonally in the cylinder head. A disposable-element type Simms fuel filter mounted by a bracket to the cylinder head filters all fuel in the system.

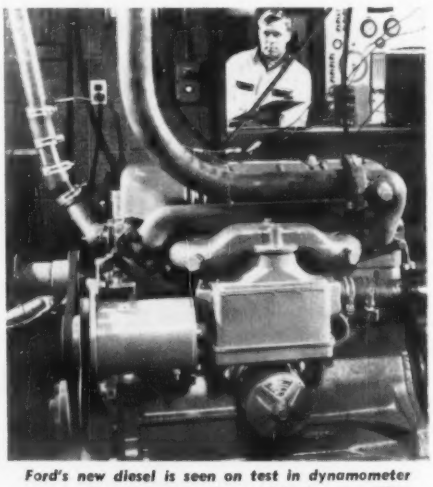
The combustion chamber is of the open type. With the piston at top dead center, most of the clearance volume is in a "Mexican-hat" shaped recess in the piston crown. This combustion chamber configuration plus proper fuel injection pressure and angle of spray provide thorough mixing of fuel and air to give efficient burning of the fuel and clean exhaust.

Although the Ford diesel and gasoline engines are similar in size and appearance, the diesel is equipped with larger intake and exhaust systems. A unique, large-capacity oil-bath air filter made by Industrial Wire Cloth Products, Inc., is used. This is very conveniently mounted under the intake manifold, reducing considerably the overhead space necessary to accommodate the engine. It receives its air supply through an inlet tube connected to a pre-cleaner screen and louvred cover assembly on the tractor hood panel. A sliding tray at the bottom of the cleaner holds the oil and can be cleaned easily. A Nelson muffler is mounted directly over the intake and exhaust manifolds.

Normal starting is provided by a 12-v Ford electric starting system. Under extreme cold weather conditions, optional manifold pre-heaters or an ether-base starting fluid may be used as a starting aid, but never at the same time. Glow plug kits are available. Two glow plugs are installed in the intake manifold to heat the air before it enters the combustion chamber. A pushbutton switch turns on and off battery current to the glow plugs. Use of these plugs is sufficient for starting the engine in winter temperatures above 15°F. The ether-base fluid is recommended for temperatures below 15°F. If an attempt has been made to start with glow plugs, Ford warns for safety reasons, that these fluids must not be used until 15 minutes after the attempt.

Conclusion

The Ford diesel tractors are similar in appearance to the new Powermaster models introduced in November 1957. All attachments in the Ford farm line will fit these diesel tractors without modification. The price economies mentioned above now bring these units within reach of many more tractor users who could not afford them before. Plus this, high compression ratio combined with the efficient direct injection fuel system provides a reported operating saving of about 40% to 50% over the gasoline engine models. This saving plus the low price differential between the diesel and gasoline engine models makes it possible to amortize this small price difference in a shorter time.



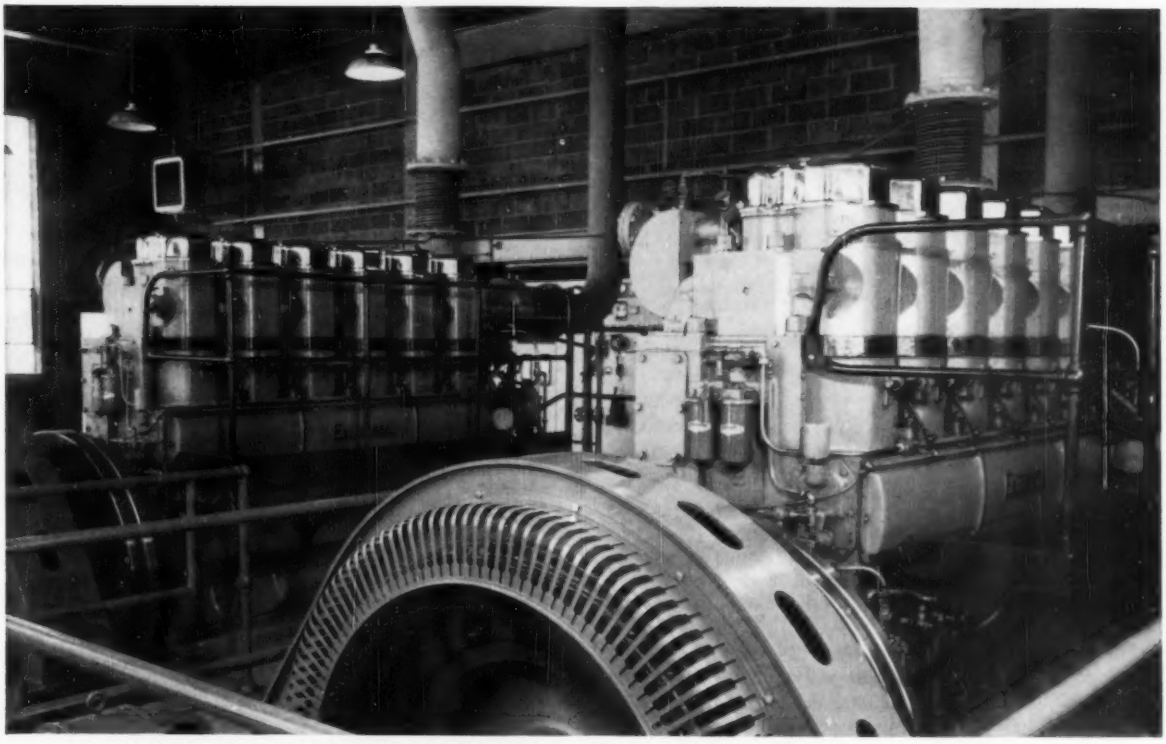
Ford's new diesel is seen on test in dynamometer test cell. Large-capacity, oil-bath air filter is conveniently mounted under intake manifold.

"3 Reasons Why I'm Sold on Enterprise—

- ✓ ***Over 56,000 combined hours of outstanding operation!***
- ✓ ***A record of very low maintenance cost!***
- ✓ ***Exceptionally good fuel and lube oil economy!"***

Clifford Severson

Manager, Municipal Power Plant,
City of Barnesville, Minn.



Two Turbocharged Enterprise Diesels, with a combined capacity of 970 KW, provide Barnesville with all its electrical requirements.

An enthusiastic booster of Enterprise Engines, Cliff Severson rates his 6 year old power plant at just about perfect. On every point of service and operating performance, Mr. Severson points with pride to cost figures that would be the envy of any economy-minded power plant operator, municipal engineer or city official.

Enterprise specializes in engines for stationary and portable electric power generation, flood and water pumping systems, and sewage plant power. Versatile fueling is available in diesel, dual fuel and spark ignited gas engines. Models range from 73 to 7703 HP. Call the Enterprise sales engineer in your area, or contact factory for information or help with your plans.

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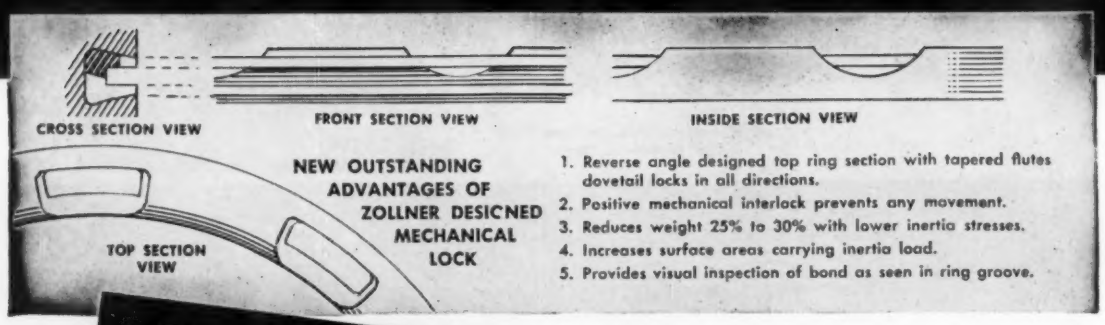
BOND-O-LOC* PISTONS

WITH "NI-RESIST" IRON TOP RING SECTION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NEW OUTSTANDING ADVANTAGES OF ZOLLNER DESIGNED MECHANICAL LOCK
1. Reverse angle designed top ring section with tapered flutes dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
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Double Bonded
METALLURGICALLY Al-Fin Bond
MECHANICALLY Zollner Lock

STOPS!

RING GROOVE WEAR IN HEAVY DUTY SERVICE

"Sensational mileage" is the unanimous report of heavy duty engine builders and transport operators using Zollner "Bond-O-Loc" Pistons. Another great development by Zollner engineers, this super-mileage piston has a "Ni-resist" top ring groove section *permanently* incorporated with the *double* bond of *both* Al-Fin metallurgic *and* the exclusive Zollner mechanical lock. Separation failure is impossible. Ring groove wear problems are eliminated, blow-by prevented, oil consumption minimized, mileage to overhauls greatly increased. We suggest an immediate test of these sensational advantages for your engine.

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THE ORIGINAL EQUIPMENT PISTONS

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Advantages of torque converter drive are available in J. I. Case farm wheel-type tractors.

Twin Disc 11-in. single-stage torque converter (left) with master clutch assembly (right) used in two models of the new J. I. Case tractors.

Torque Converter Drive for Farm Tractors

A tractor line featuring torque converter drive highlighted J. I. Case's big farm machinery show held a few months ago in Phoenix, Arizona. The company is the first major manufacturer of such equipment to offer farm-type wheel tractors with this advantageous drive as standard equipment. Here are details of the drive.

WHEN J. I. Case Company recently revamped its tractor line, a major change was made in the driveline of four models. Hydraulic torque converters were incorporated. Such drives were enjoying growing popularity in other vehicle transmissions; why not use them in farm tractors?

Analysis of operating cycles showed that the many advantages of torque converter drive could be achieved. Ease of control, operational smoothness and virtual elimination of overload downshift are a boon to the operator. The cushioning effect of hydraulic power transmission absorbs shocks and vibrations, resulting in less wear and parts replacement. Slippage in the converter takes the place of tire slippage that occurs at maximum tractive effort. So tires last longer.

All these add up to greater operating efficiency and improved economy. But since torque converters had not had widespread usage in farm tractors, a number of new application problems were created. J. I. Case turned to Twin Disc Clutch Company for help in solving these problems.

This was not unusual since cooperation between these two companies extended back 40 years, when Case was Twin Disc's first clutch customer. Plus this, Twin Disc was a pioneer in this country in industrial-type torque converter design and application. Also, they had industrial-type single-stage aluminum torque converters in 11-, 13- and 15-in. models suitable for the J. I. Case tractor line.

The two companies' engineers set to work on the problems of torque converter application to farm tractors.

Setting the Requirements

One result of this mutual cooperation was recognition that a mechanical direct drive as well as the torque converter drive would be an advantage. The direct drive should be at the option of the operator, with finger-tip control for maximum utility and operator ease.

This called for a master or "cut-off clutch" behind the converter to allow the mechanical transmission to be shifted. Being after the torque-multiplying converter, the clutch would need a capacity at least equal to twice the engine's torque. Thus, power actuation was desirable.

What was needed appeared to be a package including a direct-drive clutch, a torque converter and a master clutch. All this had to be within a 13-in. overall length for the Case Model 800 tractor, a 4-cyl diesel-powered unit. In addition, an oil pump drive and an engine power take-off were required.

Licking the Clutch Problems

Preliminary investigation pointed to use of hydraulic clutches because:

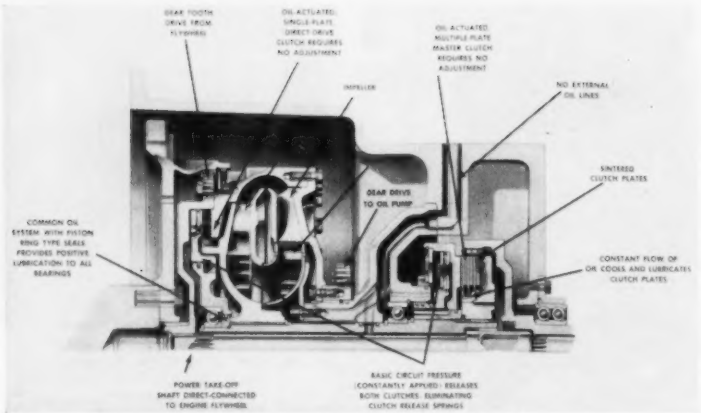
1. They would use common oil from the converter circuit.

2. Running wet, they would stay cool under severe service.

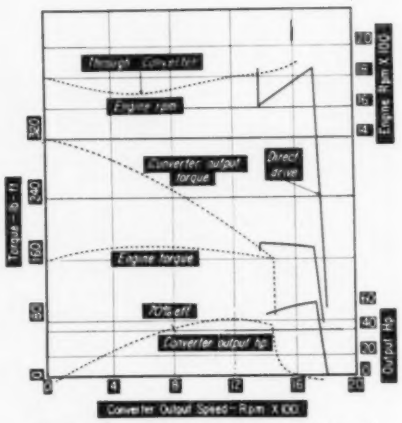
3. They would have high torque capacity as clamping force varies directly with oil pressure applied.

4. They would require no adjustment.

However, if hydraulic clutches were to be used a serious disadvantage had to be licked. Normally, these clutches are not too compact because heavy release


GEAR TOOTH DRIVE FROM FLYWHEEL
OIL-ACTUATED SINGLE-PLATE DIRECT-DRIVE CLUTCH REQUIRES NO ADJUSTMENT
OIL-ACTUATED MULTIPLE-PLATE MASTER CLUTCH REQUIRES NO ADJUSTMENT
IMPELLER
NO EXTERNAL OIL LINES
SINTERED CLUTCH PLATES
GEAR DRIVE TO OIL PUMP
COMMON OIL SYSTEM WITH PISTON RING TYPE SEALS PROVIDES POSITIVE LUBRICATION TO ALL BEARINGS
CONSTANT FLOW OF OIL COOLS AND LUBRICATES CLUTCH PLATES
POWER TAKE-OFF SHAFT DIRECT-CONNECTED TO ENGINE FLYWHEEL
BASIC CIRCUIT PRESSURE (CONSTANTLY APPLIED) RELEASES BOTH CLUTCHES, ELIMINATING CLUTCH RELEASE SPRINGS

Cutaway of Case tractor transmission shows components of Twin Disc single-stage torque converter (left) and master clutch (right).



Curves show performance characteristics of Twin Disc torque converter in Case tractor.

springs are required. They must squeeze oil out of the actuating cylinder when the clutch is disengaged. In some designs these springs must also overcome centrifugal pressure built up in the oil as the parts turn. At high speeds, these pressures can be considerable.

With only 13 inches to work in, something new had had to be devised. The cutaway view shows that Twin Disc engineers did the job without springs. They used the converter's basic pressure to release the clutch (Twin Disc has applied for patent protection on this method of clutch release).

Oil at the 40-psi basic pressure is introduced to the converter through a cored hole in the stationary manifold to which the converter guide wheel is anchored. A drilled hole from the master clutch actuating cylinder to this cored hole admits circuit pressure to the double-actuating cylinder. This circuit pressure, therefore, holds the clutch in the released position.

Similarly, the basic pressure is exerted against the piston of the single-plate clutch, holding it in the released position.

The stationary manifold has two additional cored passages, both carrying high pressure oil at up to 140 psi. One passage feeds oil to the master clutch, passing it through a supporting bearing and a drilled passage to the other side of the double-actuating cylinder.

The other high-pressure passage feeds the direct-drive clutch. Oil passes through a drilled collector in the hollow quill shaft, down through the shaft and up a cored passage leading to the clutch cylinder.

As the 140-psi oil is valved into these passages it overcomes the 40-psi basic pressure and the clutches are engaged by the 100-psi differential. Since there is oil on both sides of the clutch piston at all times, the centrifugal heads or pressures are the same on both sides and balance out.

Both clutches can be independently controlled through finger-tip control of the valves. A mechanical interlock prevents engagement of the lockup clutch before the master clutch.

An advantage of the design is that every bearing and the oil pump gears get pressure lubrication. Piston ring-type seals can be used throughout, with exception of the lip-type seals preventing leakage to the mechanical transmission. Any internal leakage falls to the sump.

Converter Features

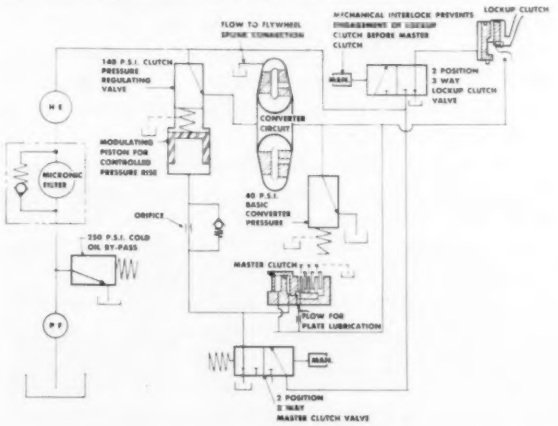
Direct-drive operation is obtained by "locking up" the converter impeller to the turbine wheel. The molded asbestos single driving plate has internal teeth that spline into a geared ring on the turbine.

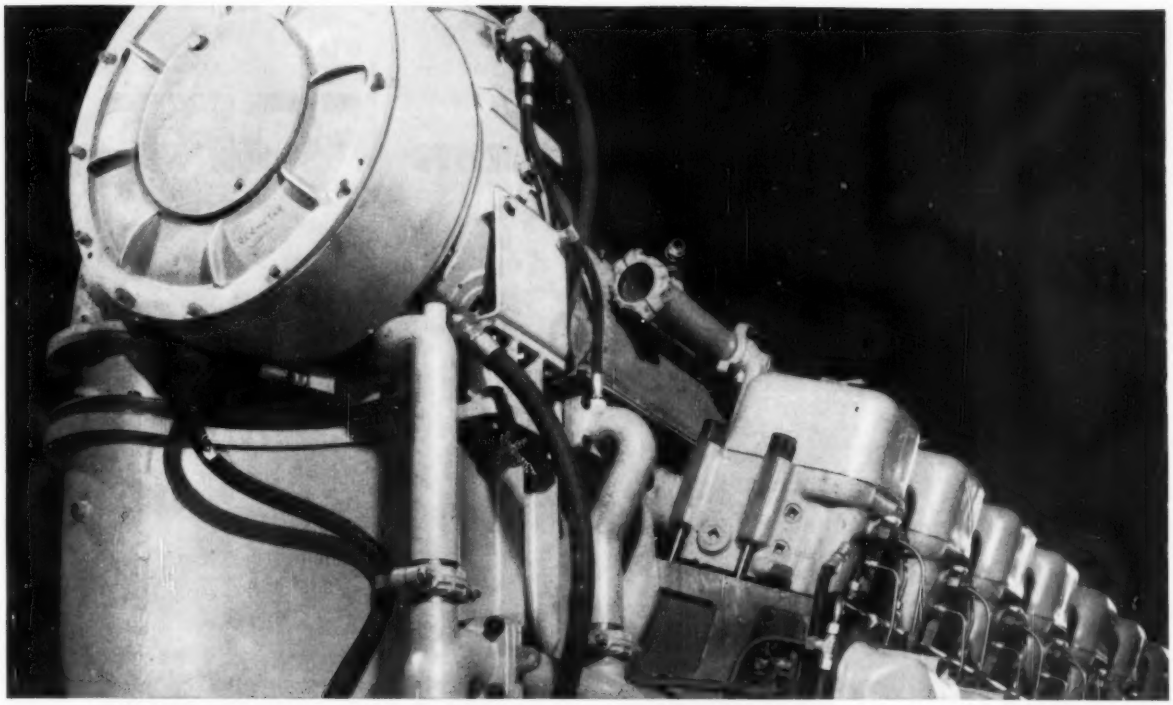
Normally in converter design, when an impeller and turbine wheel are locked together, the stator or guide stage is mounted on a freewheel so that it can rotate with the other two elements. Otherwise a severe efficiency loss would result. This converter circuit is unique in this respect. Twin Disc designers calculated the flow pattern of this circuit to permit a stationary guide wheel, eliminating need for a freewheel mechanism.

Another feature is the hollow quill shaft on which

(*Continued on Page 77*)

Complete hydraulic circuit and clutch arrangement for new torque converter equipped Case tractors. Operation is described in text.


FLOW TO FLYWHEEL SPLINE CONNECTION
MECHANICAL INTERLOCK PREVENTS ENGAGEMENT OF LOCKUP CLUTCH BEFORE MASTER CLUTCH
LOCKUP CLUTCH
140 P.S.I. CLUTCH PRESSURE REGULATING VALVE
2 POSITION 3 WAY LOCKUP CLUTCH VALVE
CONVERTER CIRCUIT
MODULATING PISTON FOR CONTROLLED PRESSURE RISE
MICRONIC FILTER
40 P.S.I. BASIC CONVERTER PRESSURE
ORIFICE
250 P.S.I. COLD OIL BY-PASS
MASTER CLUTCH
FLOW FOR PLATE LUBRICATION
2 POSITION 2 WAY MASTER CLUTCH VALVE



Ni-Resist manifolds are now standard equipment on all model 251 diesels made by Alco Products, Inc. of Schenectady, New York. Alco selected Type 3 Ni-Resist (30% Nickel, 3% Chromium) because of its superior heat resistance and lower thermal expansion.

How Ni-Resist manifolds help you gain benefits of turbocharging with no boost in engine maintenance

Turbocharging steps up power . . . steps up heat, too . . . sometimes to 1200°F. Engineers have to handle this high-temperature problem to keep maintenance costs down. Over 1100°F, the heat-resistance of gray iron is inadequate. It burns out, cracks, warps. Engineers need a metal with better high-temperature properties.

Type 3 Ni-Resist manifolds can take 1200°F

Ni-Resist*, high alloy nickel heat and corrosion-resisting cast iron, has proved itself. It gives long, dependable performance. Its resistance to heat, thermal shock and scaling keeps maintenance costs down, even under the severest of service conditions.

Three reasons why

1. At maximum design temperatures, Ni-Resist manifolds resist oxidation and scaling, prevent troublesome flake-off.

2. Cracking of manifolds, common with gray iron, is prevented by the high strength and resistance to thermal shock of Ni-Resist iron.

3. Ni-Resist cast manifolds do not warp. The low coefficient of expansion of Ni-Resist Type 3 iron prevents undue working between long manifold sections and the turbocharger's casing.

Free 64-page booklet, "Engineering Properties and Applications of Ni-Resist," tells about the properties of Ni-Resist iron in other diesel engine applications. Covers compositions, machinability and castability. Fill in coupon below for your copy.

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Please send me your booklet, "Engineering Properties and Applications of Ni-Resist" and include the "Buyers Guide for Ni-Resist Castings."

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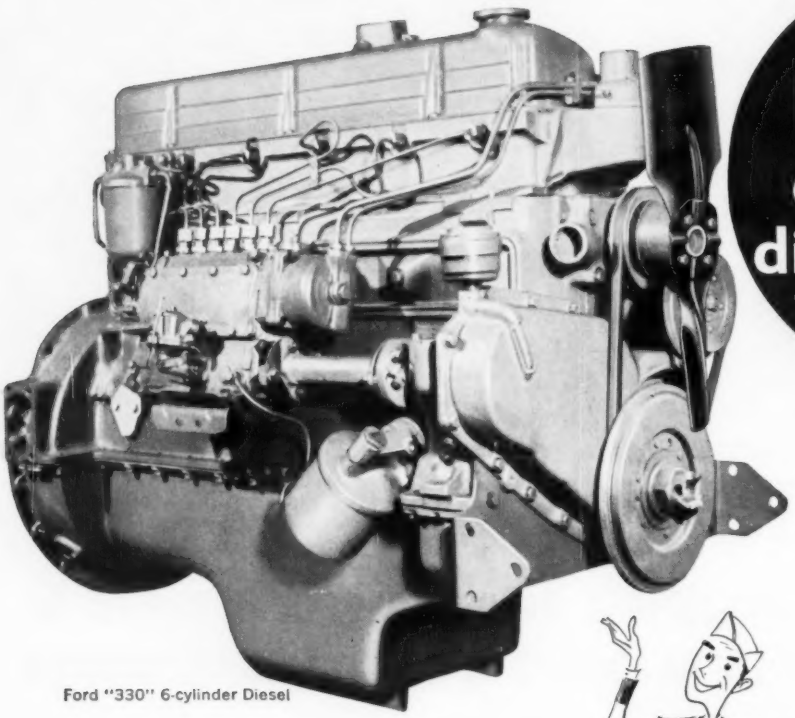
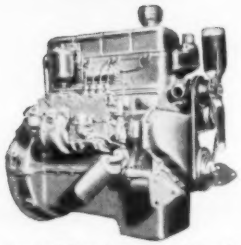
Another modern diesel from FORD—

330 cubic inch displacement



Ford "330" 6-cylinder Diesel



Ford "220" 4-cylinder Diesel

Ford
INDUSTRIAL ENGINES
AND POWER UNITS

For dependable, heavy-duty service, you'll find the new Ford "330" Diesel hard to beat.

Clean and simple in design, the Ford Heavy Duty "330" is quality-built throughout for quick all-weather starting, dependable performance and top operating economy.

Included among its many advanced features are: removable "wet" cylinder sleeves that eliminate costly reboring; precision-made Four-Way Injectors giving higher combustion efficiency, greater economy; and rotating exhaust valves for better seating, longer life.

For power that's right for your particular application, choose either the new Ford Heavy Duty "330" Diesel or the Ford "220" Diesel.

ENGINE SPECIFICATIONS		"220"	"330"
Basic Model		X	Y
Number of Cylinders		Four	Six
Bore and Stroke—Inches		3.94 x 4.52	3.94 x 4.52
Displacement—Cubic Inches		220	330
Brake Horsepower	Dynamometer	60 @ 2250	96 @ 2250
	Continuous	48 @ 2250	77 @ 2250
Torque	Dynamometer	151#' @ 1600	236#' @ 1600
	Continuous	121#' @ 1600	189#' @ 1600
Compression Ratio		16 to 1	16 to 1

INDUSTRIAL ENGINE DEPARTMENT • FORD Division of FORD MOTOR COMPANY
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YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

(*Continued from Page 74*)

the turbine is mounted. This permitted an internal power takeoff drive directly from the engine flywheel. In this way, power takeoff rpm remains at an efficient speed even when the main output shaft speed is reduced under heavy drawbar loads.

Clutch Controls

Suitability of the master clutch valve can make or break the performance of this drive in tractor operation. Twin Disc engineers found years ago that a basic disadvantage of hydraulic clutches was their harsh engagement. This was overcome by design of a pressure regulating valve to permit a gradual pressure rise and rate of engagement within the clutch cylinder. This principle was used in the master clutch valve.

A schematic diagram of the complete hydraulic circuit is shown. Starting at the left, transmission "C" type oil is taken out of the sump by a gear pump and passed through a filter and heat exchanger. This high-pressure oil goes to the pressure regulating valve, the lockup clutch valve and the master clutch valve.

The pressure regulating valve is in effect a relief valve having a spring that can be variably loaded by a modulating piston. This valve controls operating oil pressure. Spill from this valve feeds both the converter circuit and the release side of the pistons with 40-psi oil. The latter pressure is maintained by a conventional spring relief valve.

Ordinarily, the high-pressure oil circuit is below the maximum of 140 psi. When the master clutch valve is opened, this oil is directed to the pressure side of the clutch piston. It also flows through an orifice to the underside of the modulating piston where, because of differential areas, it starts to load the regulating valve spring. Pressure is gradually increased in the system until the modulating piston is stopped by a shoulder. At this point, system pressure is 140 psi.

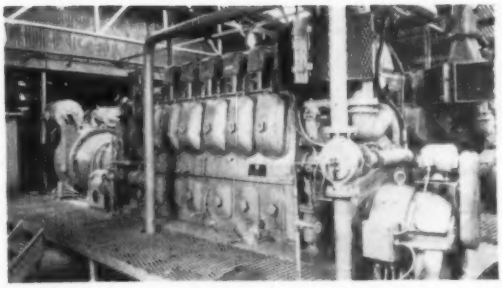
By this method, pressure is applied gradually and clutch operation is smooth. Engagement time is controlled by the orifice diameter.

Upon master clutch release, a ball check valve bypasses oil from under the modulating piston around the restrictive orifice, quickly unloading the regulating spring.

Summary

Through cooperation of J. I. Case Company and the Twin Disc Clutch Company, the advantages of torque converter drive are available in standard farm wheel-type tractors. The operator has the choice of automatically-adjusted hydraulic torque multiplication to meet changing load conditions or direct drive, all through fingertip control.

In working out the problems of this new application, new ideas were developed in converter technology (the stationary guide wheel during lockup), in hydraulic clutch actuation and control, plus a new standard of compactness.



Oil Industry Power Packages Now Assembled In Oil Country

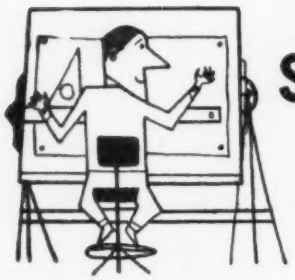
ALCO Products, Inc. has opened a diesel-electric power package assembly plant in Beaumont, Texas. W. R. Jones has been named product supervisor, T. A. Gallagher is project engineer for drill rigs and oil field equipment.

The new plant is located in the heart of oil drilling, production and refining operations. It is said that no drilling site or industrial installation on the so-called "Gold Coast" is more than 12 hours away from this center.

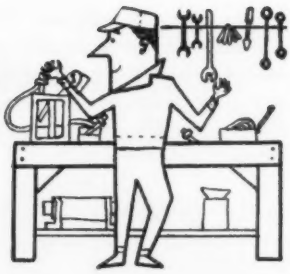
Skilled Alco technicians assemble power packages on a slab providing a 12,000-ft working area. A feature of the new facility is a giant fork-lift truck reported to be the largest ever put into use in the Southwest. It has a lifting capacity of 20 tons.

Plus providing power packages for the drilling industry, the new plant is geared to provide power for pipeline pumping stations, emergency and standby electric sets and other industrial needs.

For Drilling rigs, the power package includes two or three Alco 900-hp, 6-cyl Model 251 diesels and an instrument and control panel also assembled in Beaumont. The power package is a completely self-contained unit for drilling requiring no additional power source.



service section



Recent engine and equipment modifications, procedures and recommendations straight from the different manufacturers to you

Installing Front Crankshaft Oil Seal on Cummins JS

To assure proper assembly on the front oil seal, Part No. 70522, in the gear case cover of JS engines, it is necessary to use service tool, ST-480. If the tool is not used the seal may leak. To install the seal with ST-480 mandrel, follow this procedure:

1. Place the gear case cover, gasket face down, on the flat surface on an arbor press-table. If the table is not large enough, cover it with a ¼-in steel plate about 2-ft square.
2. Coat the outside and inside diameters of the oil seal and the bore of the gear case cover with Lubriplate, or similar lubricant.
3. Place oil seal over the end and against the shoulder of ST-480 mandrel. Oil seal must be assembled with lip toward engine.
4. Pilot the mandrel in the oil seal bore and press downward until the bottom surface of the mandrel contacts the surface on which the gear case cover is resting. This locates the seal in its correct position with approximately 1/16-in. gap between the lip side of the seal and the shoulder in the bore of the gear case cover.

Governor Linkage Adjustment on Roosa Master

Measurement of the governor linkage hook for length adjustment to insure correct metering valve travel in model "D" pumps is made as follows:

With cover removed and throttle lever held in "full-fuel" position, measure with a feeler gauge between the shut-off cam and the tab which extends from the governor linkage hook.

A measurement of 0.025—0.035-in. was called for formerly. This is now changed to 0.030—0.040-in. unless otherwise specified in the Service Specifications.

Adjustment is made by opening or closing the formed "hump" in the hook, making sure that the linkage remains straight to prevent bind at the metering valve arm pin.

Cat Turbocharging Kit

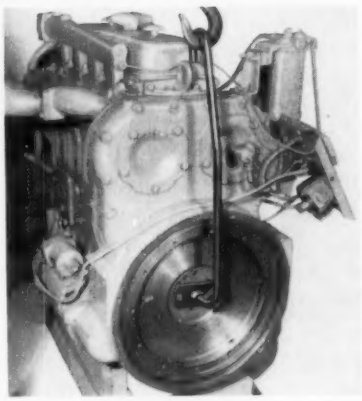
Reduction of engine horsepower caused by operation at high altitudes can now be eliminated on the Caterpillar D8 Tractor by the use of a Normalizing Kit recently introduced by Caterpillar Tractor Co.

The new kit consists of a turbocharger and all manifolds and adaptors needed to mount it on the tractor engine. This overcomes the cause of high-altitude power loss — insufficient oxygen to permit complete combustion of fuel.

The turbocharger delivers air to the inlet manifold at greater than atmospheric pressure, thus permitting complete fuel combustion and restoring sea-level horsepower up to 10,000 ft altitude. For example, when operating at an altitude of 8000 ft, the normalized D8 will operate at the machine's sea-level rating of 191 hp, while the standard D8's capacity at the same altitude would be 151 hp.

The Normalizing Kit does not increase the sea-level horsepower of the tractor but serves only to provide the needed oxygen to burn the same amount of fuel at high altitudes as at sea level.

The kit is available either for factory installation on new D6, D7 and D8 Tractors, or for field installation on machines already in operation.



Improved GM Flywheel Lifting Hook

A newly-designed flywheel lifting hook, service tool J6361 is now available for use on all Series 51, 71 and 110 Detroit Diesel engine flywheels.

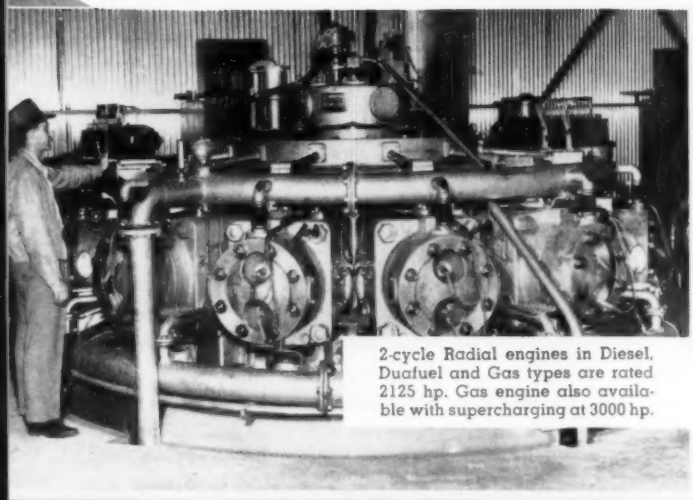
The new lifting hook bolts securely to the hub of the engine flywheel eliminating the possibility of dropping the flywheel when it is being removed or mounted on the engine crankshaft. The lifting bar remains perpendicular to the flywheel and provides a means for pulling the flywheel away from the crankshaft.

The bolting plate on the end of the lifting bar rotates so that the flywheel can be rotated to line up the flywheel dowels or holes in the crankshaft. This feature eliminates the use of the jacking screws and the removing and replacing studs.

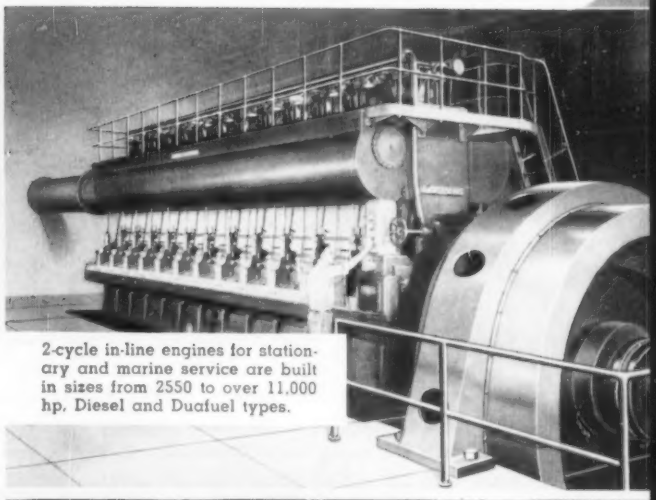
The hook provides an easy method for handling flywheels and offers a decided advantage from a safety standpoint.

The new service tool should be ordered directly from the Kent-Moore Organization, Inc.

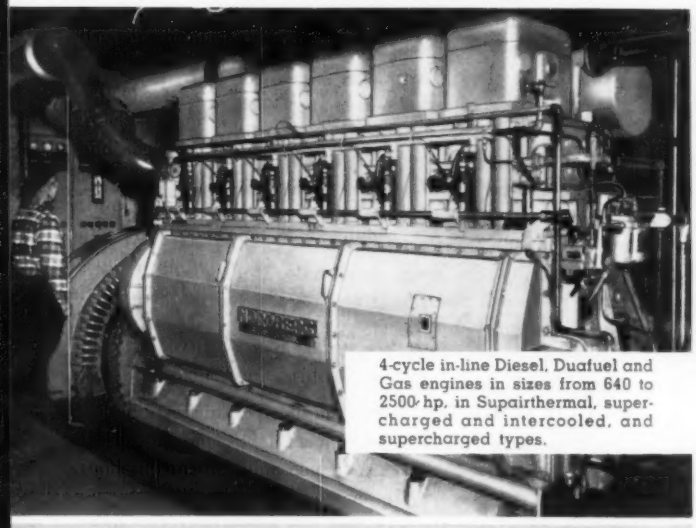
NORDBERG Engines and Experience can solve your power problems . . .



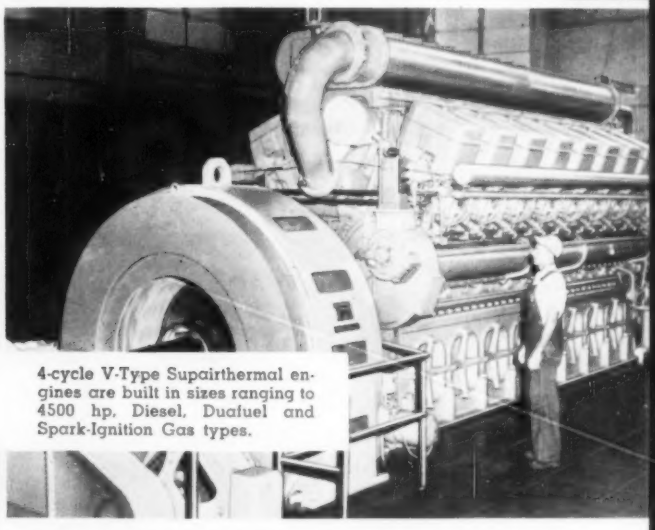
2-cycle Radial engines in Diesel, Duafuel and Gas types are rated 2125 hp. Gas engine also available with supercharging at 3000 hp.



2-cycle in-line engines for stationary and marine service are built in sizes from 2550 to over 11,000 hp. Diesel and Duafuel types.

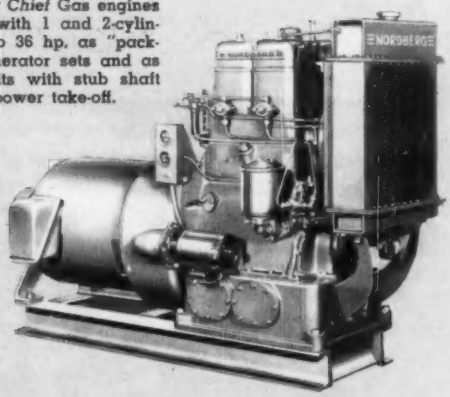


4-cycle in-line Diesel, Duafuel and Gas engines in sizes from 640 to 2500 hp. in Supairthermal, supercharged and intercooled, and supercharged types.



4-cycle V-Type Supairthermal engines are built in sizes ranging to 4500 hp. Diesel, Duafuel and Spark-Ignition Gas types.

Power Chief® Diesels are offered with 1, 2 and 3-cylinders, rated 10 to 45 hp or 6 to 30 kw. *Power Chief* Gas engines are built with 1 and 2-cylinders, up to 36 hp, as "packaged" generator sets and as power units with stub shaft or clutch power take-off.



• Pioneer in the Diesel and Gas engine industry, Nordberg has contributed many of the most notable advancements in the development of more efficient prime movers . . . all in the interest of improved fuel economy, simplicity of design, less maintenance and better overall performance. As a result of this experience, Nordberg today . . . with a full range of engine sizes, from 10 to over 11,000 hp, including Diesel, Duafuel® and Spark-Ignition Gas types, is in the best position to help solve your stationary and marine power problems.

NORDBERG MFG. CO., Milwaukee, Wis.

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DIESEL •, DUAFUEL® AND SPARK IGNITION GAS ENGINES

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P557-R

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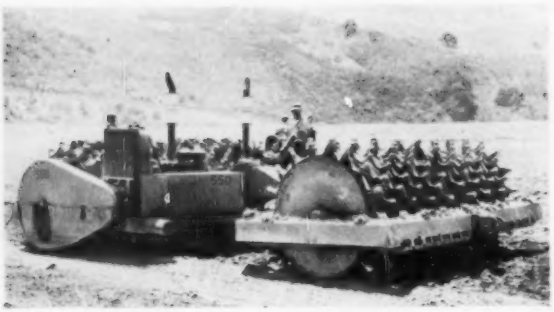

Compactor Does Work Of Three Tractor-Tampers

An impressive speed of 8 mph is claimed for this 100,000-lb fill-compactor designed by the Mittry Construction Co. of Santa Maria, Cal. The diesel-powered unit is shown at a dam site near Santa Maria where it was keeping pace with 22, 18-yd bottom-dump earthmovers. It has four drums equipped with sheepsfoot tampers and is reported to do the job of three ordinary tractor-drawn tampers.

The compactor is powered by two 6-cyl Series 71 GM diesel engines delivering up to 200 hp each through Allison transmissions.

Engineering Secretarial Students Observe Application of Diesel Power

Recently a group of 45 engineering secretarial students from the Business Training College in Pittsburgh made a field trip. These girls went to PRR's Pittsburgh passenger station to observe application of diesel power in railroading.

The school's training program plus these field trips do a thorough job of familiarizing these engineering secretaries of the future with technical terms that will make them do their jobs more efficiently later on. Here's a chance to get that hard-to-find trained secretary with technical background.

Bulk Carrier Rigs For Peru

Three 22-wheel bulk carrier rigs — largest off-the-highway units of their type ever built — are ready for shipment to Peru. They are designed to haul 80 long tons loads from the Marcona mine to the Pacific Coast port of San Juan, 250 miles south of Lima.

Each tractor and trailer is equipped with a hydrotarder braking system to help control the ¼-million-lb (loaded weight) units as they descend steep grades. This system uses a hydraulically-controlled water coupling in the drive shaft which, by varying the water pressure, acts as an additional braking system to supplement conventional brakes on each wheel.

A specially designed single-axle, four-wheel "jeep" coupled between the tractor and carrier permits distribution of the unit's loaded weight over all 22 wheels. The three-section rig measures 68 ft from bumper to bumper.

The 12-ft high ore gondolas were made by Western Iron and Body Works, Inc., Oakland, Calif. The 10-ft by 18-ft bottom-dump hoppers were made from "Kaisaloy," a special high-strength steel produced by Kaiser Steel Corp.

The rigs are powered by 335-hp, Kenworth model 848 tractors. The three tractors and the gondola trailer axle assemblies were built by Kenworth Motor Truck. The "jeeps" were built by Fruehauf Trailer Co.

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people and plants . . Page 88

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Army to Build Closed-Cycle Gas Turbine Plant

Ground has been broken at the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., for the first closed-cycle gas turbine test facility in the U. S.

The system will operate on a regenerating closed cycle with nitrogen as working fluid. An oil-fired heater will be substituted for an atomic reactor (to be used later) as the heat source in this test facility. The nitrogen is heated to over 1000°F in the heater and expanded through a 2-stage, axial-flow turbine. The turbine, in turn, acts to drive a 2-stage centrifugal-flow nitrogen compressor and the generator which produces electric power. The power will be dissipated through an immersion heater located outside the building.

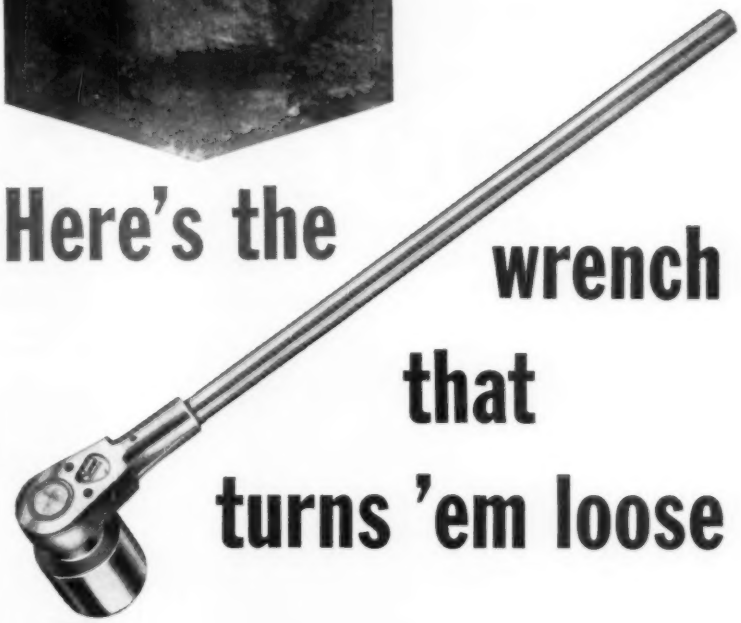
Information gained from operation of this unit will be combined with results and operating experience to be gained from the Atomic Energy Commission's gas-cooled reactor experiment. This will form the basis for design of a mobile gas-cooled nuclear power plant for military applications. The gas-cooled reactor experiment project is now in the design and component development stage.

White Trucks to Pakistan

A batch of seven White trucks powered with Rolls-Royce 6-cyl unsupercharged 200-hp diesel engines, were recently completed and shipped by the White Motor Company's Montreal plant. The trucks were shipped to Pakistan, where they will supplement considerable numbers of White and Rolls-Royce equipment in service on the Warsak power and irrigation dam project. This is part of Canada's contribution to the Colombo Plan.

These units will bring the total value of the order for engines and spare parts sent to the Warsak project to date to more than $350,000. Sixty-two Rolls-Royce units are already in service on the project in trucks, rear dumpers, generating sets, mobile cranes, concrete mixers, and carriers.

Big and tight and mean with rust . . .



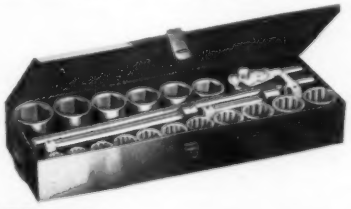
Here's the wrench that turns 'em loose

*Snap-on EXTRA HEAVY-DUTY LOXOCKET®

When those big nuts are bolted tight, or mean with rust, these *Snap-on* Extra Heavy-Duty Wrenches break 'em free. Same tremendous leverage pulls 'em tight on assembly work, too.

It's solid as a one-piece wrench. Loxocket design holds wrench and socket head together safely, surely — won't let them come apart accidentally. Flick the release button and you change sockets instantly. Sockets are hot-broached to give smooth, strong walls and corners — heat-treated all the way through for lasting toughness — plated to resist rust.

Set includes 11 double-hex sockets for 1-7/16 in. to 2-1/2 in. nuts; 6 single-hex sockets for 2-3/8 in. to 3-1/8 in. nuts.



Got a tool problem — Call the *Snap-on* man

Snap-on tool specialists are located in key industrial centers throughout the nation. Call your nearest branch or write us. Complete tool catalog on request.

No. 521-EHD-B set, 21 tools in all. Complete with ratchet head, sliding bar, two extension bars and sturdy case.

SNAP-ON TOOLS CORPORATION

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industry news

(*Continued from Page* 81)

OGP Annual Conference and Exhibit

The 30th Annual Conference and Exhibit of the Oil and Gas Power Div. of the American Society of Mechanical Engineers will be held on May 12-15 at the Bellevue Stratford Hotel in Philadelphia.

The following papers will be given at the technical sessions: (1) "Arctic Lubrication of Diesel Engines" (2) "Development of A Turbocharged Uniflow Two-Cycle Spark-Ignition Gas Engine" (3) "Development Of A Light-Weight High-Output Four-Cycle Diesel Engine For Naval Service" (4) "The Bureau Of Ships' Part In The Development Of A Diesel Engine For The United States Navy" (5) "The U. S. Naval Engineering Experiment Station's Part In The Development Of A Diesel Engine For The U. S. Navy" (6) "The Contractor's Part In The Development Of A Diesel Engine For The U. S. Navy" (7) "Lubrication Of Large Diesel Cylinders" (8) "A New Look At Diesel Lubrication" (9) "Performance Of Economy Diesel Fuels In A Railroad Locomotive Type Diesel Engine" (10) "A Method Of Charge Stratification For Spark Ignition Engines" (11) "Scientific Design Of A Diesel Governor" (12) "The Filtration Of Diesel Engine Oils" (13) "The Free-Piston Engine Possibilities" (14) "The Buchi Telescope Valve System Of Four-Cycle Diesel Engines".

There will also be a panel discussion on maintenance of fuel injection systems and one on maintenance of turbocharging equipment.

An exhibit will include latest products and developments of many manufacturers.

In addition there will be social hours, luncheons, a banquet, presentation of awards and other interesting affairs.

White Motor to Boost Truck Output

White Motor Co. is increasing truck production at its Cleveland plant by about 20%.

Mr. J. E. Adams, Vice President of Manufacturing, said a big increase in orders received during November and December made this move necessary. He also said that the present order backlog at White is the largest since last March.

The increase in business was attributed to a number of new truck models introduced by the company during the late fall. These have met with an excellent reception throughout the country. Strengthening White's diesel truck line to meet the growing dieselization trend in the highway transport industry has also accounted for a substantial part of the increase.

Diesel-Electric Locomotives For Brazil

Brazil's Paulista Railroad has purchased 10 universal diesel-electric locomotives from the General Electric Co. The order totals about $1½ million.

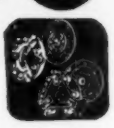
The new units will be used for passenger, freight and switching service in the state of Sao Paulo.

ROCKFORD

LONG LIFE Heavy-Duty POWER TAKE-OFF

ELIMINATES OUT-BOARD BEARINGS AND COUPLINGS

The heavy-duty construction of ROCKFORD Oil Field type POWER TAKE-OFF bearing assemblies will handle side loads that formerly required the use of out-board bearings—with hangers and flexible couplings. Shaft deflection is no problem with this extra heavy-duty power take-off—when the load is held within specifications. You can reduce the over-all length of the engine and power take-off assembly by specifying ROCKFORD.


Small Spring Loaded

Heavy Duty Spring Loaded

Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs

Speed Reducers

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Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

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CLUTCHES

Predicted Trends for High-Speed Diesels and Fuels

Greater amounts of cracked distillates will be used to fuel high-speed diesels of the future according to G. C. Wilson, of Ethyl Corp. research laboratories. Some high points of Mr. Wilson's talk before a meeting of the Metropolitan Section of the SAE follow:

(1) High-quality diesel fuel can be made from cracked distillates but certain additives may be required in some cases. These include fuel stabilizers and an ignition accelerator to increase cetane number.

(2) Diesel fuel quality is being improved by reducing sulfur content through hydrogenation.

(3) More efficient performance of high-speed diesel engines may be secured by metering fuel into the intake air instead of directly into the cylinders. Further improvement will result if combustion improvers are developed for fuels.

(4) A reduction in the range of fuel properties would permit engines to be designed and adjusted for more efficient operation.

LPG to be Stored In N. J. Caverns

The Esso Standard Oil Company expects to put two huge caverns, cut out of solid rock, into use this year for storage of liquefied petroleum gas.

The caverns are being opened 300 ft below ground level near Esso's Bayway refinery at Linden, N. J. Excavation on the first cavern, which began January, 1957, probably will be completed this spring.

A network of 6000 ft of interconnecting tunnels about 13-ft wide and 22-ft high will provide storage for 28,000,000 gal of LPG.

The installations, according to Esso Standard, will be the first mined caverns on the East Coast for storage of petroleum products.

Fleet Adds 35 Mack Diesels

Jones Motor, Inc., of Spring City, Pa., has announced the purchase of 35 Mack diesel tractors for use in its transport fleet.

(*Continued on Page* 93)

SEE what **VANADIUM** corrosion
did to this Piston
and to this Boiler Tube

Vanadium and sodium in the fuel wasted away almost an inch of metal from the head of this Diesel piston. Note how the wall thickness of the boiler tube has been reduced by these corrosives.

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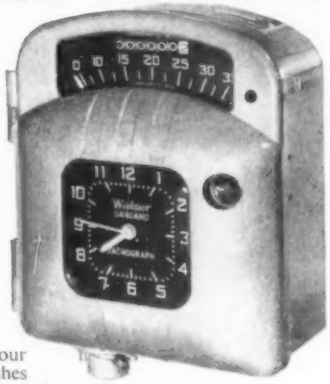
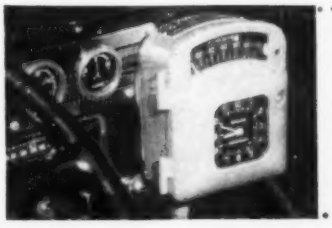
you can cut down "lugging"... save fuel... lengthen engine life with

TACHOGRAPH
the recording tachometer



The Wagner-Sangamo RPM Tachograph keeps your drivers posted on engine speed at all times—flashes a warning signal to warn of excessive engine speeds and provides supervisors with an accurate charted record to check operator performance. Model BB Tachographs are available for 12 or 24 hour records and for 2500 or 3500 RPM maximum engine speeds. Find out NOW how a small investment in a Tachograph for every diesel you operate can pay big dividends by encouraging safer, more economical driving. Mail the coupon below.



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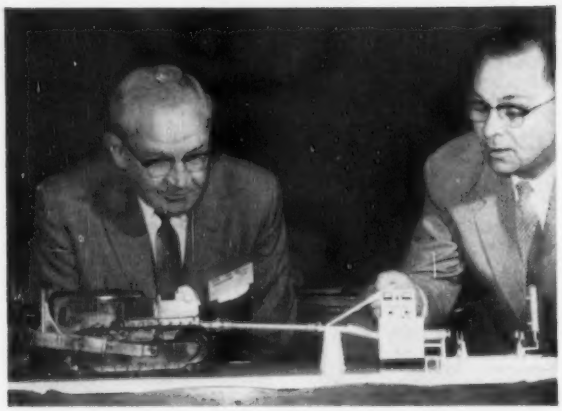
new products



Clayton Tractor and Engine Dynamometer

New Clayton Universal tractor and engine dynamometer test equipment is now available. It permits checking the power characteristics of tractors and other off-highway equipment without removing engine from the chassis and also dynamometer run-in and test of basic engines and power units. Seen with tester model are J. A. Cortright, (left) vice president sales, and G. R. Mackey, sales manager of Dynamometer Div., Clayton Mfg. Co.

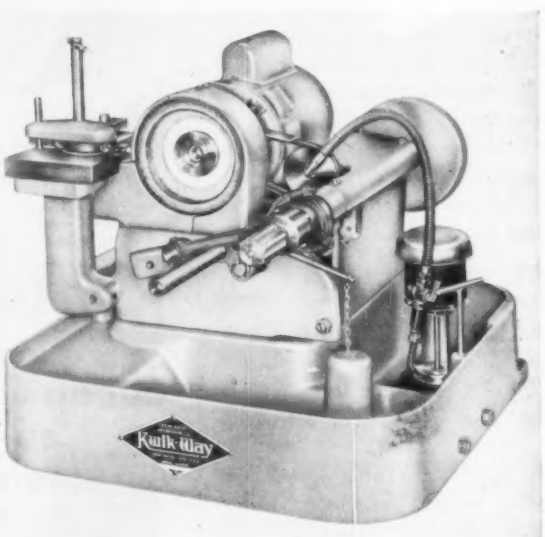
The new unit handles tractors with engines up to 450 hp and developing up to 1800 lb ft torque at 1000 rpm at the power take-off. It also handles engines and power units, with mechanical clutches or torque converters, up to 700 hp, developing up to 2600 lb ft torque from 1000 rpm up.

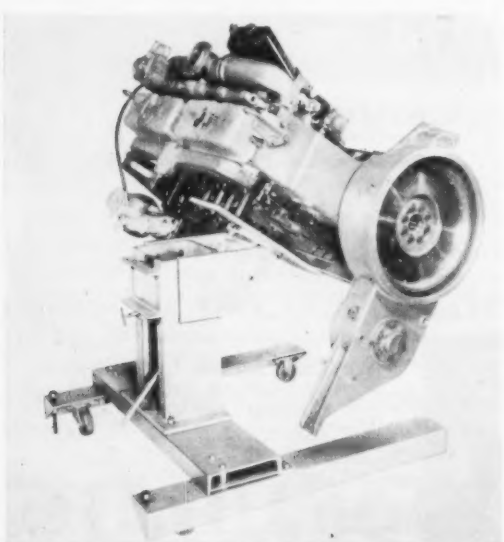
New Kwik-Way "Rod Master"

Cedar Rapids Engineering Co., Cedar Rapids, Iowa now offers the new Kwik-Way "Rod Master". It is designed to perform the two primary operations in reconditioning the journal end of connecting rods—cap grinding and honing the journal bore to precision limits without taper or out-of-roundness.

The "Rod Master" incorporates a combination checking and facing gauge making cap grinding simple and accurate. A 5-in. cup-type grinding wheel gives fast cutting. No special tools are needed for wheel dressing.

The new unit reconditions small or large rods with equal ease. It features a hone of unique design using expanding steel blades and special abrasive cloth. Other features are: large honing fluid sump with settling basin; pump with independent motor, regulator valve and adjustable nozzle; foot control for honing operations.





Kent-Moore Develops Universal Engine Stand

Kent-Moore Organization, Inc., has developed a new and convenient universal diesel engine stand. The manufacturer states this stand has been released only after months of trial and field testing in cooperation with leading engine and equipment manufacturers.

A large-capacity hydraulic pump lifts the side-mounted engine to a horizontal position. The engine can then be raised or lowered to a convenient height for working on any section of the unit. All hand-cranking has been eliminated. Only one-man is needed to operate the stand to handle even the largest automotive-type diesel engines with ease.

Using tapered roller bearings, oilite bearings and structural steel, this stand is engineered for long, trouble-free service. A complete line of adapters are available so that it can be used with any make of engine.

Periscope Flashlight

The Laging-Schultz Co. has introduced a new product for inspectors and service men. It is the Peri-Light, Periscope Flashlight.

This unit, powered by two flashlight batteries, makes it possible to see around stationary objects, between walls and into small openings. It can be turned 360 deg for easy viewing up, down or sideways.

Kato Improves Generator Line

Three principal design features are involved in Kato's improved generator line. The exciter end-bell bearing has been completely eliminated. Now the exciter armature is supported by the main alternator bearing. Only one heavy-duty ball bearing, grease-sealed for life, is used since the generator drive end is supported by the engine driving it.

Mounting foot length has been reduced and use of four mounting feet eliminated in most cases. This permits accuracy and ease of alignment of the generator to the engine. If shimming is necessary, it often can be done at only one point.

Design and placement of outlet box and control panel has been improved. In many cases, lamination diameter has been increased and the core length decreased. Cooling fan and shaft design has been improved.

Kleer-Flo Machine Cleans Diesel Parts

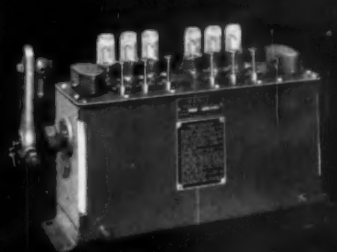
Practical Products Co. makes a multi-purpose parts cleaner—the Super Cleanmaster, Model 50. The machine cleans all types of diesel engine parts. Three methods are used. First, a pump continuously forces filtered cleaning fluid through a semi-rigid hose. Second, a large air-agitated soaking tank accommodates two large baskets of parts. Third, a jet air gun is used which also speeds parts drying.

MANZEL

accurate, controlled, timed lubrication

Get the automatic, timed lubrication you need to protect valuable machinery, eliminate downtime, cut maintenance costs. Wide range of Manzel Lubricators and controls, in single and multi-feed units, will solve any lubrication problem. A Manzel field engineer will help select the model you need.

LUBRICATORS by Manzel



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Morco dealers — coast to coast — are stocked with reconditioned, like-new crankshafts for different diesel engine models. Users of Detroit Diesel and Cummins engines can exchange worn shafts for MORCO factory-reconditioned shafts through authorized dealers.

Why take chances? Let your dealer be your source for dependable, safe crankshaft regrinding. You get immediate service, guaranteed quality and terrific economy. Ask your dealer about MORCO today.

Look what Morco's **complete reconditioning service offers you!**

Magnaflux—six separate magnaflux inspections with latest equipment.

Ground on production type equipment to engine manufacturer's specifications. Original stroke retained.

TOCCO* **Induction Hardened** by the original equipment method when necessary.

Rolled Fillets increase strength at the most critical areas.

Dynamic Balance restored on original factory balancing equipment.

Thrust Collars and surfaces repaired.

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Key Ways restored.

Dowel Holes repaired.

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Threads repaired.

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new products

(*Continued from Page* 85)

Rust Solvent and Penetrant In Pressurized Container

Spray Products Corp. has announced the development of a new formula, fast-acting penetrant and rust solvent.

The new formula "Spray Nuts-Off" is designed to loosen anything rusted or corroded. It is a combination of oils, penetrants and rust solvents chemically formulated to provide exceptionally fast solvent and penetrating properties. It is said to be excellent for cleaning small parts and battery terminals in addition to loosening nuts and bolts.

Spray Nuts-Off is packaged in a 12 oz. aerosol container that eliminates spillage and evaporation. It is also being marketed in pint and gallon containers.

Portable Fluorescent Penetrant Inspection Kit

A portable fluorescent penetrant inspection kit is now available for locating cracks, pores, leaks and other defects open to the surface in any solid material. Known as the Zyglo ZA-43, the kit contains the most sensitive Zyglo materials—all in push-button, pressurized spray cans. It complements a wide variety of non-destructive test systems developed and sold by Magnaflux Corp.

Included in the kit's steel carrying case are: pressurized spray cans of cleaner, penetrant, and developer; a 100-w, high-intensity Black Light; cleaning cloths; wire brush; and detailed instructions.

Electric Etcher Permanently Marks Iron or Steel

A wide variety of iron and steel parts can be quickly marked for identification with the new Martindale 14-heat electric etcher. The Model 4M offers convenient rotary switching, with instant availability of heat ranges from 50 to 1350 watts.

Two straight writing tips are furnished: one copper and one tungsten-tipped. The etching tool has been designed for greatest ease in writing at varied speeds and depth of marking.

New Boring Machine For Connecting Rods

Homestrand Inc., have announced a new precision boring machine, the Swedish Larsson CL-17 Fineborer. It is designed for boring of connecting rods, valve rocker arms, etc.

Its accuracy is said to be better than 0.0001-in. Its range is 0.600-in. to 1.800-in. and table travel is 8¼-in. Adjustment of the cutting tool is made with a dial indicator with the piston pin or a master gauge as a reference. The desired clearance can be set on the direct reading indicator. A folder is available.

New Balancing Machines

A complete line of Rava Electro-Dynamic balancing machines has been developed by the Tinius Olsen Testing Machine Co. for production and short-run balancing. These static-dynamic horizontal balancing machines use a highly sensitive electrical measuring system. Both the angle and amount of unbalance are determined quickly by adjusting simple, electrical controls.

Work piece is rotated at speeds up to 3600 rpm by a direct motor drive using a universal joint. Speeds to 36,000 rpm are available with an auxiliary frequency converter.

The balancing machines are built in a wide range of sizes for parts weighing from a few ounces to a ton or more.

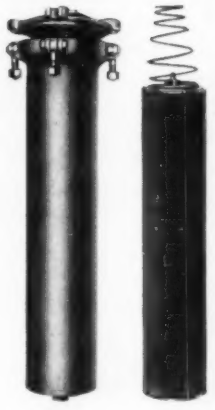
Cat Output Sustained at High Altitudes

Caterpillar D6 tractors horsepower no longer need be reduced at high altitudes. This is made possible by use of a Normalizing Kit recently made available by the Caterpillar Tractor Co. for both factory and field installations. The D6 Tractor thus joins the D7 and D8 to become the third machine to be provided with the Normalizing Kit.

The new kit consists of a turbocharger and all manifolds needed to mount it on the tractor engine. The turbocharger delivers air to the inlet manifold at pressure high enough to restore "sea level" horsepower up to 10,000-ft altitude.

(Continued on Page 94)

NUGENT
FILTERS • STRAINERS
LUBRICATION SPECIALTIES



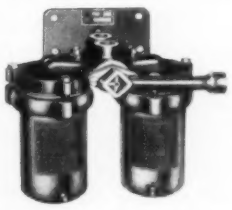


Fig. 1555BF Duplex Filter uses factory packaged laminated fiber disc filtering elements. Each filter comprising duplex operates independently or in parallel. Wide range of sizes.

Fig. 1576 Bag-Type Pressure Filters feature inexpensive, completely disposable filter cartridges. For filtering fuel oil, lubricating oil and wide variety of fluids.

AT LEFT: Fig. 1555-4L Filter and laminated disc cartridge. High flow rate; low pressure drop. Excellent micronic efficiency. Cartridges interchangeable with all other Nugent Bag or Depth Type cartridges.

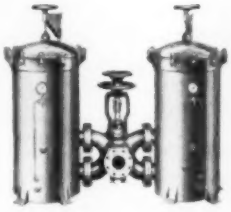


Fig. 1554AN-4L7 Duplex Strainers provide the advantage of uninterrupted flow, without by-passing, while cleaning the strainer baskets. Each strainer comprising duplex uses 7 strainer baskets Fig. 1554A-4L.

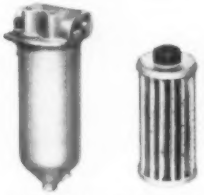


Fig. 1490AM-0 star-shaped extended area strainers offer increased free screen area over round basket type.

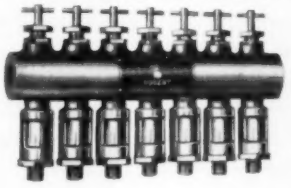


Fig. 1503F Multiple Pressure Oilers are available with from 2 to 24 feeds.

Fig. 524 Sight Feed Valves with removable glass. ¼" to ¾" IPS.

Fig. 1575 Pressure Sight Flow Lubricator. Single units or multiples to 15.

Fig. 1366E Sight Flow Fittings for indicating flow of liquid in a pipe line. Available in brass, cast iron, steel or stainless steel.

Valuable equipment deserves the best possible protection that can be provided. Nugent offers a complete line of filters, strainers and lubrication specialties for this purpose. All are backed by the experience and know-how gained through solving industry's problems in this field for more than 60 years. For bulletins giving complete information on any or all Nugent products, call or write today.

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SIGHT FEED VALVES • FLOW INDICATORS

people and plants

New N. Y. District Mgr. For Nordberg

Appointment of H. W. "Herb" Dow, Jr. as manager, N. Y. District Office, Engine Div. was announced by R. E. Friend, president, Nordberg Mfg. Co. Mr. Dow succeeds A. R. McMullin who retired after being N. Y. manager since 1936. Dow joined Nordberg as a production engineer in 1943 and entered sales engineering in 1945. Since 1955, he has been a special representative of Engine Div. in N. Y.

H. W. Dow, Jr.

Allis-Chalmers Buys Some Micromatic Hone Corp. Assets

In a joint statement, S. S. Connor, president of Micromatic Hone Corp. and B. S. Oberlick, group vice president of Allis-Chalmers, announced the sale of certain assets of Micromatic's Micro-Precision Div. to Allis-Chalmers.

Under terms of the sale Allis-Chalmers has acquired all machinery, equipment, inventories and patents relating to diesel operation. Micro-Precision has been engaged in making diesel fuel injection systems. All elements in the purchase will transfer to the Allis-Chalmers plant in Harvey, Ill.

New GM Distributor For Iowa-Nebraska Area

The Detroit Diesel Engine Div. of General Motors has appointed Hicklin-GM Diesel, Inc., distributor of the Division's line of diesels in Iowa and the eastern two-thirds of Nebraska. The new distributorship also includes sections of Illinois and South Dakota bordering on Iowa.

Heading the new company is R. V. Hicklin, president. J. B. Gilbert is business manager.

Fram Expands Industrial Division

Fram Corp., Providence, R. I., has enlarged its Industrial Div., according to W. W. Eaton, sales mgr.

In the past, Fram has sold its industrial filters through its automotive salesmen. A new group of sales representatives will now devote full time to sales of the industrial line.

Four regional industrial sales managers have been named: C. B. Gouert, Jr., West Coast sales; P. S. Innis, Southwest sales; C. N. Haskins, Middle West sales; J. S. Evans, Northeast sales.

Kent-Moore V-P Retires

Retirement of A. E. Price vice-president, has been announced by the Kent-Moore Organization, Inc., Mr. Price, was presented a statement of commendation for 36 years of outstanding service. He began his career at the service tool engineering and manufacturing firm as a machine operator in 1922.

Mr. Price will now act as an independent industrial consultant conducting special surveys and any new account promotional activities the company may see fit to sponsor from time to time.

New District Office for DeLaval

DeLaval Separator Co., Chicago, Ill., has announced opening of a new district office in Minneapolis, Minn. D. E. Hutson will be in charge.

Complete sales and engineering facilities for DeLaval centrifugal machinery and plate heat exchanger equipment will be available to industries in the Minneapolis-St. Paul area.

Change at GM Diesel, Ltd.

G. M. Lynch has been named district manager for General Motors Diesel Limited. He will cover the Canadian provinces of Alberta, Saskatchewan and Manitoba.

Mr. Lynch has more than 25 years of service with GM—most of it in western Canada.

New Home for Kittell

Kittell Muffler & Engineering, Inc., makers of silencers and spark arrestors, have moved all operations into a new building. This is located at 1977 Blake Avenue, Los Angeles. The new plant contains more than twice the floor area of the company's former facilities. There is ample room for further expansion, plus adequate parking space. According to H. A. Wiedenman, president, the increased floor space and more efficient plant layout were necessitated by the increased sales.

John Clem

Air-Maze Appoints Sales Manager

Appointment of John Clem as sales manager was announced by W. B. Watterson, vice-president and director of sales for Air-Maze Corp. Mr. Clem has been district manager of the company's Chicago office. His appointment fills the vacancy created by the resignation of Frank Purvis.

Before coming to Air-Maze, Mr. Clem was associated with Fairbanks, Morse & Company in its experimental and research departments and general diesel sales.

Cummins Gets Crankshaft Machining Co.

Purchase by Cummins Engine Co., Inc., Columbus, Ind., of Atlas Crankshaft, Inc., Fostoria, Ohio, has been announced by R. E. Huthsteiner, president of Cummins, and E. A. Harper, president of Atlas.

Atlas machines crankshafts for nearly 20 leading manufacturers of diesel and gasoline engines and compressors. Cummins Engine Company has been a major customer of Atlas for several years. Atlas was organized in January of 1940.

KIENE® hydraulic test pump

new revolutionary design . . . made expressly for field service

CONNECTOR SET KIT
makes convenient connection of test pump to most popular makes and models of diesel engines. Fixtures for testing Cummins and General Motors engines available.

CORROSION-PROOF MECHANISM.
LIGHT WEIGHT ALUMINUM CASE.
HEAVY DUTY HYDRAULIC GAUGE—
EASILY INTERCHANGEABLE—
SWIVELS 360° ON TWO PLANES.
LARGE FUEL CAPACITY—10 MICRONS
PRECISION FILTERS—KIENE PATENTED
DIAPHRAM TYPE VALVES.
FLEXIBLE AND RIGID PUMP CONNECTIONS

No Bolts — No Clamps

Kiene Portable Hydraulic Test Pump is an entirely new and different product for the Diesel Industry — with features never before available in the field of injection and hydraulic repair and servicing tools. It offers all operating advantages of existing pumps and introduces many new features. No bolts or clamps required for leverage—to operate you simply use squeezing action on hand lever.

Write for Descriptive Bulletin KTP-50

KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

Admiral
A. W. Radford

Admiral On Worthington Board

Admiral A. W. Radford, former Chairman of Joint Chiefs of Staff, has been elected a member of the Board of Directors of Worthington Corp.

Admiral Radford recently retired from the Navy after 45 years of distinguished service. His combat commands included a carrier task force in the Pacific during World War II, and he was Commander in Chief of the Pacific Fleet in the early stages of the Korean War. He made important contributions to the development of the Aeronautic Organization of the Navy, and to Naval post-war planning.

P-I-E Regional Manager

Pacific Intermountain Express is reorganizing to keep pace with the company's business and territorial expansion. Regional vice presidents have been appointed in three new territories in its decentralizing program.

O. M. Collett will be in charge of the Intermountain region with headquarters in Salt Lake City. C. B. Taufer heads the Pacific region with offices in Oakland while A. H. Schaefer, Jr. is named vice president of the Midwest region with headquarters in Chicago.

C. G. Zwingle, vice president of operations, will be responsible for coordinating activities of these three regional vice presidents.

Made Gould-National Manager

C. W. Hanna is the new Chicago regional manager of the Industrial Division of Gould-National Batteries, Inc. He started his association with Gould in 1935.

J. O. Lutz

Correction Please

This item is repeated from the February issue with the correct photograph. Our apologies to Mr. Lutz.

Mr. W. E. Wilkening, president of Wilkening Mfg. Co., announced recently the promotion of Mr. John O. Lutz to the newly-created post of general sales manager.

Mr. Lutz will supervise sales activities of the Automotive Replacement Div. of which Mr. R. W. Doherty continues as sales manager, of the Industrial Div. of which Mr. H. R. Kelly continues as sales manager, of the Manufacturers or Original-Equipment Div. and the Export Div.

(Continued on Page 96)

new literature

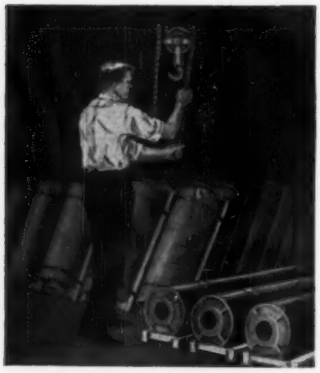
A-C Logging Publication

If you're interested in logging, you'll want to be on the mailing list of "Timber Topics". Published by Allis-Chalmers Construction Machinery Division, this bi-monthly reports news and features articles of wide interest in the field.

Cat Maintenance Guide

A new Maintenance Guide for Caterpillar D2, D4 and D6 Tractors has been prepared especially for operators. Its primary purpose is to supplement the more detailed information found in Caterpillar "Operation and Maintenance" books.

The Maintenance Guide is filled with more than 80 full-color drawings illustrating helpful service tips. Written in narrative form, the 24-page booklet tells how one machine owner improved the performance and longevity of his tractor through good maintenance methods. Cartoons are used to emphasize these methods.



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ON MANY TYPES AND SIZES OF

MAXIM SILENCERS

Need silencers on short notice? Contact Maxim. We are now stocking an increasing number of the more widely used types and sizes. As a result, we may be able to give you immediate delivery.

If the type and size you need is not in stock, you can still depend upon Maxim to give you best delivery — from the *most complete line of industrial silencers.* Equally important, you can count upon outstanding performance — in the tradition that has made Maxim the preferred silencer throughout industry. Maxim, more than ever, stands for special customer service.

THE MAXIM SILENCER COMPANY

Subsidiary of Emhart Manufacturing Company

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Twin-Disc Magazine Available

Latest issue of Twin Disc Clutch Company's magazine "Production Road" covers 100 years of progress in American agriculture. Progress of farm machinery and equipment is described and facts and figures given on social and economic changes.

Other articles feature the new J. I. Case farm tractors using T-D single-stage torque converter and friction clutch; a story on the new Twin Disc MG-521 marine reverse and reduction gear; and other stories on manufacturing, construction, logging, air-conditioning and mining.

Blackmer Pump Releases Three Catalogs

A recently released 8-page color catalog describes the complete line of rotary power pumps manufactured by Blackmer Pump Co. Fully illustrated, the catalog features more than two dozen photographs and drawings depicting their highly diversified power pump lines.

Another 8-page color catalog describes the complete line of rotary-gland bearing pumps made by the company. This catalog presents important design and construction features in easy to read form and includes cutaway photos and diagrams, plus charts dealing with available construction options.

The third, a new two-color catalog, describes the "Ezy-Kleen" strainer line made by Blackmer. The catalog uses cutaway and installation pictures to point out construction features and operation of the strainers. Also included is a selection chart for the determination of the proper strainer.

Booklet On Diesel Ownership and Operating Costs

A guide to determine ownership and operating costs of various engines has been prepared by Cummins, Inc. This 26-page booklet entitled "Evaluating Diesel Power for Motor Trucks," tells: (1) How truck operators can calculate savings possible by using diesel instead of gasoline power; (2) How to determine the engine that can be most profitably used; (3) How driver techniques, speeds and terrain affect fuel economy; (4) How to match engine to specific horsepower requirements; (5) How higher average roadspeeds are possible with diesel power; (6) How road failures can be reduced; (7) How gasoline and diesel maintenance costs compare; (8) The maximum weight and length laws for each state; (9) Performance and service features of Cummins engines.

GE Booklet On Oil Drilling Control

A 4-page illustrated booklet has been published by the General Electric Co. It explains how General Electric's oil well drilling drive systems with simplified controls provide lower cost per foot of hole; less rig maintenance; better, easier drilling control; more rig portability; and improved drilling equipment protection.

Allis-Chalmers Catalogs

Allis-Chalmers construction equipment accessories are covered in a new 4-page piece of literature—MS-1270—now available. These accessories increase the versatility of Allis-Chalmers motor scrapers, motor wagons and pull-type scrapers; promote higher production; and provide added operator comfort and safety.

Another catalog discusses A-C's line of irrigation engines. Views and cutaways of power units; engine components; engine horsepower graphs; units in action; and specifications, illustrate the new catalog (BU-415).

A third catalog describes the features and application of A-C's new diesel engine Models D-344 and D-516. Performance curves are also given on the 88-hp D-344 and 131-hp D-516 units.

Marathon Bulletin Features Synchronous Generator Data

A new 10-insert loose-leaf bulletin No. SB-184 by Marathon Electric Mfg. Corp., features 320-, 400-, 500- and 580-frame synchronous generators from 30 to 300 kw at 1800 rpm for use with diesel engines.

Separate insert pages show generator- and wall-mounted control cabinets; connection diagrams for selecting voltages from 120 to 480; and list of 340 stations servicing Marathon motors and generators.

Spicer Offers Folder On Transmission

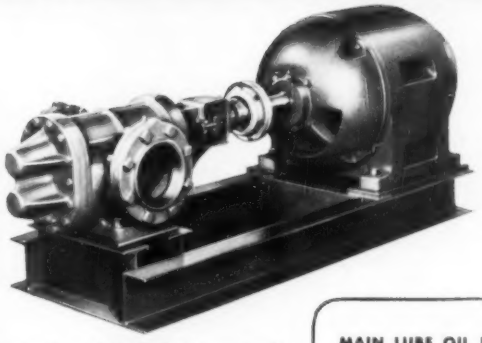
Spicer Mfg. Div. of Dana Corp. has issued a folder entitled "Light-Weight Work-Horse for Heavy Trucking". This illustrated folder shows and describes the features of Spicer's new Model 8125 12-speed transmission Synchro-Master. Performance curves are also given.

This multiple-speed transmission is said to be shorter and lighter than comparable capacity units.

(*Continued on Page 99*)

ROPER PUMPS

Complete Pumping Service for the Diesel Field

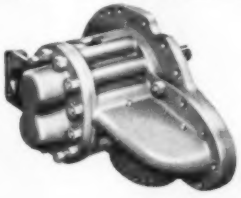


Series 3600 — 40 to 600 G.P.M. up to 60 P.S.I. Packed Box construction, hardened steel shafts, hardened alloy iron pumping gears. Heavy duty bronze bearings.

Series F — 1 to 300 G.P.M. up to 300 P.S.I. Packed Box or Mechanical Seal construction, hardened steel shafts, steel pumping gears, heavy duty flange type bronze bearings.

Series K — 1 to 50 G.P.M. up to 150 P.S.I. Packed Box or Mechanical Seal construction, hardened steel shafts, hardened steel pumping gears, heavy duty bronze bearings.

Custom — Adapting the Roper pumping principle to customer's requirements.



MAIN LUBE OIL PUMPS
Motor Driven
Engine Driven

STANDBY LUBE OIL
Before and After Pumps

FUEL SUPPLY PUMPS
Motor Driven
Engine Driven

AUXILIARY SERVICE PUMP
Fuel Transfer
Lube Oil Transfer
Hydraulic Power Control Pump

Write for catalog

ROPER
HYDRAULICS, INC.

164 Blackhawk Park Ave., Rockford, Ill.

NEW HIGH SPEED ADJUSTABLE CLOSURES,
IN A WIDE VARIETY OF SIZES AND SHAPES, CUT PRODUCTION TIME AND COSTS!

Snap-Tite® or Turn-Tite®

Cam or Lever Action Test Plugs and Seals designed for high production use!

Snap-Tite types for use during processing of machine parts, tubes, molds, castings, tanks and for testing low pressure applications. *Turn-Tite* types for higher pressure applications. Also where restricted clearance prohibits cam action closure. Also types to accommodate pressure line connector. Snap-Tite and Turn-Tite also used as permanent parts of finished products.

Write for catalog

Direct Inquiries to Dept. 29

MOELLER Mfg. Co., Inc.
Industrial Division
2401 DURAND AVE.
RACINE, WIS.

PRECISION MADE GUARANTEED NEW
FACTORY REPLACEMENT PARTS FOR

CUMMINS MODELS NH, HB
GENERAL MOTORS DETROIT SERIES 71
GENERAL MOTORS CLEVELAND MODELS 268A, 278A
GENERAL MOTORS ELECTROMOTIVE
MODELS 567ATL & 184 (Pancake)
HALLETT MODEL DMCR-4
HAMILTON HOR MODEL R-99-DA
HERCULES KERMATH MODELS DIX, DWX, DFX, DOO, DJX
SUPERIOR MODELS GDB-8 & ID-8

DIESEL ENGINES AND ACCESSORIES
AVAILABLE FOR QUICK DELIVERIES
FROM OUR MILLION DOLLAR STOCK
AT SUBSTANTIAL SAVINGS

KORODY MARINE CORPORATION
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INSTANT START, NO BATTERIES WITH

AIR STARTING MOTORS!

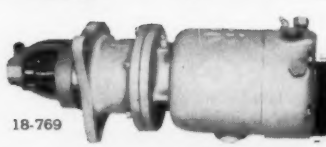
Dependable: Fast, positive starts regardless of temperature. Made by the originators of Air Starting Motors.

Low cost: Eliminates batteries, generators, electrical parts and their maintenance.

Less weight: I-R Air Starting Motor installations weigh less than conventional batteries and generators . . .

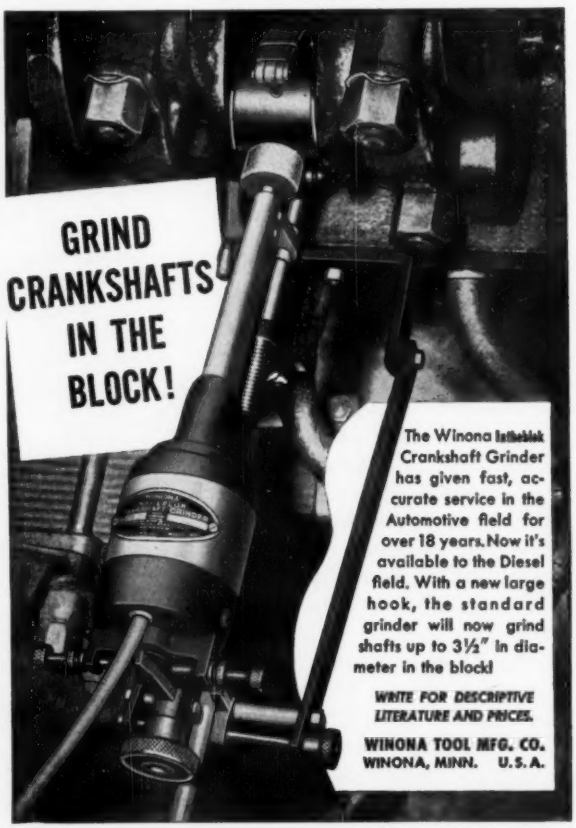
Three sizes: I-R Air Starting Motors are made in models to meet the needs of almost all stationary, auxiliary and motive engines.

Ingersoll-Rand
11 Broadway, New York 4, N.Y.



Write for new Air Starting bulletin Form 5094D.

18-769



GRIND CRANKSHAFTS IN THE BLOCK!

The Winona Istheblok Crankshaft Grinder has given fast, accurate service in the Automotive field for over 18 years. Now it's available to the Diesel field. With a new large hook, the standard grinder will now grind shafts up to 3½" in diameter in the block!

WRITE FOR DESCRIPTIVE LITERATURE AND PRICES.

WINONA TOOL MFG. CO.
WINONA, MINN. U.S.A.

industry news

(*Continued from Page 83*)

Gas Turbine Conference A Success

Eight hundred engineers and scientists attended a 4-day, third Annual Gas Turbine Conference and exhibit in Washington, D. C., from March 2 to 6. They reviewed the latest progress in the rapidly growing field of gas turbine engines. More than 20 technical papers and talks were heard describing use of new units to provide power at remote desert locations, to propel aircraft, generate electricity and to drive industrial machinery.

One speaker described nuclear reactors as an energy source for gas turbines. Another outlined recent tests in which turbines performed more than twice as well as their designers had hoped.

Technical sessions at the Conference, sponsored by The American Society of Mechanical Engineers, were supplemented by a display of new models of gas turbine engines and related devices and materials.

A visit was also made to the U. S. Naval Gun Factory to view a display of gas turbines in use as generator drives, fire pumps and the latest in boat and helicopter propulsion.

A.E.R.A. Annual Convention

Members of the Automotive Engine Rebuilders Association are scheduled to meet in Washington, D. C., on May 11-14 for their 36th Annual Convention. The Sheraton-Park Hotel will be the scene of activities.

Some of the meaty discussions scheduled include the following topics: (1) Panel Discussion: "Valves, Lifters and Camshaft Problems"; (2) Technical Tips; (3) Lubrication; (4) Panel Discussion: Running-In Engines; (5) Magnetic Inspection; (6) Marine Engine Market; (7) Formalized Apprentice Training; (8) Shop Kinks; (9) Shop Costs

Bacharach Expands School

As a result of its recent move into new quarters which provided three times the former plant facilities, Bacharach Industrial Instrument Co. has greatly expanded its diesel fuel injection service shop school program.

The school covers training in servicing all popular makes and types of fuel injection nozzles, injectors and fuel pumps. This is possible because of the universal applicability of Bacharach diesel fuel injection testing equipment.

The school is normally of one week duration and is open to users of Bacharach equipment. It is held periodically when groups of sufficient size can be arranged.

Latest F-M Engine Sales

Fifty three engines have been sold by Fairbanks, Morse & Co. during the last three and half months. These included four, 7-cyl and three 10-cyl Model 38F5¼; one, 6-cyl, four 10-cyl and two 12-cyl Model 38D8⅛; one 10-cyl Model 33FD16; one 6-cyl and two 10-cyl Model 31A18; two 2-cyl, five 4-cyl, and three 6-cyl Model 49; twenty Model 48; and five Model 45 units.

Most of these were generating sets however some power units for various applications were also included.

The World's Leading Manufacturers of

FUEL INJECTION EQUIPMENT

for Diesel Engines

Depots and Service Agents in over 100 countries

C.A.V.

FUEL INJECTION EQUIPMENT DIVISION

of

LUCAS ELECTRICAL SERVICES, INC.

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Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Canadian Distributors:
Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario
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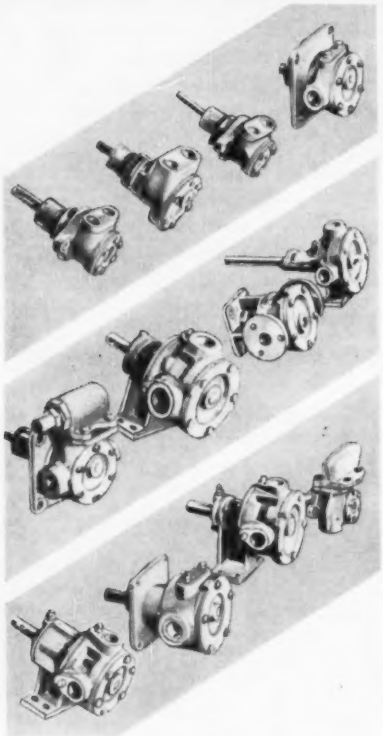
*AP*174-819

WHAT PUMP DO YOU NEED?



VIKING DESIGNS PUMPS TO FIT YOUR SPECIFICATIONS

CHECK VIKING Pumps when you are designing equipment that requires positive lubrication, a flow of coolant, or the transfer of a liquid or semi-solid. Viking Pumps, designed to fit your equipment, can help you save space ...plan more efficient operation... and, in many cases, cut costs of equipment.

SEND VIKING YOUR PROBLEM CLIP THIS COUPON

Please send me your suggestions.
I have the problem of incorporating a pump in .....
for handling .....
at ..... G.P.M., under ..... psi
Name .....
Address .....
City ..... State .....

and Mail to Department D

VIKING PUMP CO.
Cedar Falls, Iowa, U.S.A.
In Canada, it's "ROTO-KING" pumps
See Our Catalog in Sweet's Product Design, and Plant Engineer's File

new products

(Continued from Page 87)

Self-Filling, Self-Bleeding Hydraulic Remote Control System

Hydronic Company's completely-hydraulic remote control system is entirely self-contained. An integral filler-bleeder fitting eliminates need for accessory pressure equipment. Time required to fill the system with oil and bleed it of air is greatly reduced.

Both operations can be done simply by leading two lines from the fitting to the fluid supply and using the master control lever as a pump.

Simple adjustment of equalizer valves permits relative positioning of master and slave levers when filling and bleeding are completed. Levers maintain absolute relationship after adjustment.

The Hydronic system provides smooth, positive, remote control of valves, clutches, transmissions, throttles, governors, conveyor gates and similar devices.

Fireless Steam Cleaner

Kelite fireless steam cleaner uses live steam from an existing steam supply. It provides efficient cleaning power of high-volume, direct-fired steam cleaners.

Maintenance of the machine is a simple matter since fire, soot, heat exchanger, scale, and special controls are eliminated. It is especially useful in hazardous locations where an open flame is not permitted, but where a steam supply exists.

A 2-page bulletin describing the Kelite fireless steam cleaner, is being offered by Kelite Corp.

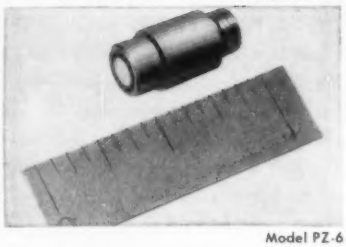
Couplings and Hose Assemblies

Just introduced by Hofmann Engineering Company is H-52 Quik-Koupler for use with industrial vinyl and other hoses. This 125-psi coupling is designed so a variety of hook-ups or a permanent connection can be made on the job.

Features of the new coupling, vinyl hose assemblies and fittings are described in an effectively presented catalog.

NEW PRODUCT NEWS

Model PZ-14



Model PZ-6

Kistler Gages Measure Engine Knock and Detonation Pressures

Quantitative measurements of pre-ignition, detonation, and other abnormal combustion pressures can now be made under the most severe engine operating conditions with the new Kistler SLM Electronic Pressure Gage. Designed to measure either pressure or pressure rate *directly*, the one basic Quartz Gage (Model PZ-14) also indicates compression, peak firing, manifold and fuel injection pressures.

Unlike the familiar mechanical-type pressure gage where an indicator needle moves back and forth, the Swiss-made SLM Electronic Gage presents a dot moving up and down on a TV-like (oscilloscope) screen. It shows *pressure at any instant*, and not merely peaks or averages. Thus the effect on cylinder pressure of valve and port operation, ignition, combustion, or timing can be readily observed. Extremely high sensitivity permits even minor variations in cylinder pressure to be greatly magnified and examined in detail.

The new SLM Sub-Miniature Pressure Gage (Model PZ-6) equipped with a specially adapted spark plug permits cylinder pressure measurements in unmodified internal combustion engines.

A new console model which includes associated Kistler Pre-Amplifier-Calibrator units, electronic switches and oscilloscopes, displays up to eight cylinder pressure signals simultaneously. Simple gang connectors (summing units) permit eight *pressure rate* signals to be superimposed on the screen.

For manufacturing test, training, field engineering, field maintenance and service applications, the new portable SLM Engine Indicator-Analyzer is the most advanced equipment developed. Unlike conventional engine analyzers which show only ignition or vibration patterns, this Kistler package provides precision measuring instrumentation that fits readily into established maintenance procedures. For complete information, request Bulletins EA-114 and S-114.

Kistler Instrument Corp., Dept. PO 15 Webster St., North Tonawanda, N.Y.

new products

New Speedhone

A speedhone for honing taper, blind and straight bores and an air-powered riveter are now available from the Barrett Equip. Co. This Speedhone, using replaceable Universal stones, will not fly apart when pulled from a cylinder while being driven by an electric drill or drill press. It has Universal point action in the honing head and a flexible drive shaft is available for special applications.

A specially-designed hone body provides support for spring arms throughout the honing range. Also, three selective pressure-positioning holes permit positioning of the spring arms for correct pressure on the stones.

New Automotive Generator

A new low-cut-in generator is available from American Bosch Div., American Bosch Arma Corp. The SSG generator and its companion regulator the SSR, are both heavy-duty units designed to withstand severe service on municipal or commercial vehicles. Both units are easily distinguishable from previous models by being painted gray instead of conventional black. The SSG generator is said to embody all the refinements developed in the past plus additional new features.

Color-Coded Gaskets

Double identification features new line of gasket and shim stock put out by Chicago-Wilcox Manufacturing Co. The plastic stock in six basic gauges and 11 stock thicknesses is coded not only by color but also by gauge number printed in over-all pattern.

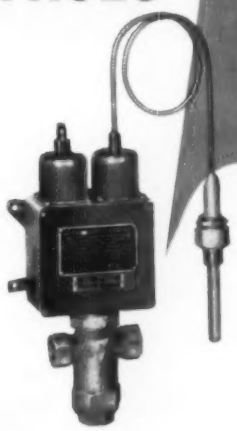
The manufacturer points up these other features of this Wil-Pak plastic sheet: impervious to oil and water, dimensionally stable, uniform in gauge an decomposition point in excess of 400°F.

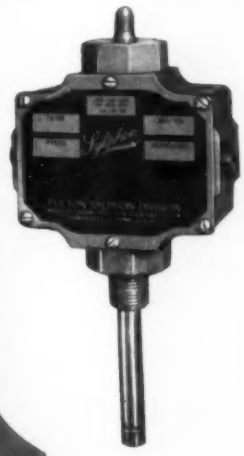
STOP
ENGINE DAMAGE

with these low-cost Fulton Sylphon
FAIL-SAFE
SAFETY CONTROLS

No. I-530 Series
Remote Bulb Type
FUEL SHUT-OFF
Safety Control

Positive engine protection against high temperature jacket water and low pressure lube oil. Fuel oil supply is immediately shut off if either exceeds safe limits. Automatic shut-off if control is damaged accidentally. Alarm optional.





No. I-539 Series
Integral Bulb Type
4-WAY SAFETY
Temperature Pressure Switch

Sounds alarm, flashes warning light, operates pilot or stops internal combustion engines if lube oil pressure drops to danger point, or if cooling water temperature is too high. Suited for many other temperature-pressure applications.

WRITE FOR CATALOG GD-817

Mr. Control®
Robertshaw-Fulton
CONTROLS COMPANY
FULTON SYLPHON DIVISION
Knoxville 1, Tenn.

people and plants

(*Continued from Page 89*)

Oakite Adds Two Divisions

Oakite Products, Inc., have announced establishment of two new divisions.

Rochester will be headquarters of the new Upper New York State Div. W. G. Sittmann, formerly Oakite's Pittsburgh Division Manager, will head the new division.

J. P. Melhando, formerly a field representative in N.Y.C. will replace Mr. Sittmann in Pittsburgh.

V. L. Baltzell, representative in Dallas for 15 years, has been appointed Manager of the MidSouth division.

Admiral Joins Napier Engines Inc.

R. J. Pflum, recently retired from the Navy with the rank of rear-admiral, has been elected vice-president-sales and a member of the board of directors of Napier Engines Inc., of Washington, D. C. Mr. Pflum, an engineering graduate of the Illinois Institute of Technology, held a number of planning, operational and administrative appointments in aviation during his period of naval service. He was cited for heroic action in combat during World War II and during the Korean War.

Personnel Changes At Marquette

F. C. Erdman is retiring as product manager of hydraulic governors at the Marquette Div. of Curtiss-Wright Corp. Mr. Erdman joined Marquette in 1938. The new product manager will be A. G. Massey, who will direct the sales of Marquette and Massey types of Curtiss-Wright governors. Mr. Massey has been general manager of Massey Machine Div. of Curtiss-Wright.

The Marquette Div. also announced that several new types of Curtiss-Wright governors will be introduced during 1958.

Fred Erdman

A. G. Massey

New Mgr. For F-M Railroad Div.

Mr. V. H. Peterson, vice-president-sales, Fairbanks, Morse & Co., has announced appointment of Mr. R. Aldag as manager of the Railroad Div. Mr. Aldag, has been with F-M a number of years as a sales engineer, and manager of the sales engineering dept. He will concentrate on sale of locomotives and small diesels for mechanized railroad refrigerator cars.

New Director of Research & Development at DeLaval

DeLaval Steam Turbine Co., has announced appointment of Dr. Karol Pilarczyk as director of research and development.

The staff of the research and development program has been increased for an expanded research program. W. H. Wiebe remains chief research and development engineer and H. W. Ebeling, superintendent of the engineering laboratory.

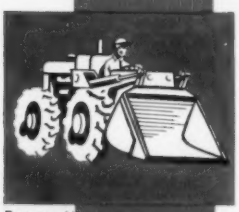
the best costs less

Simplicity is the word for ROOSA MASTER fuel injection pumps. Small in size and weighing less than 10 pounds, there are fewer parts to service, fewer adjustments, which means lower service costs.

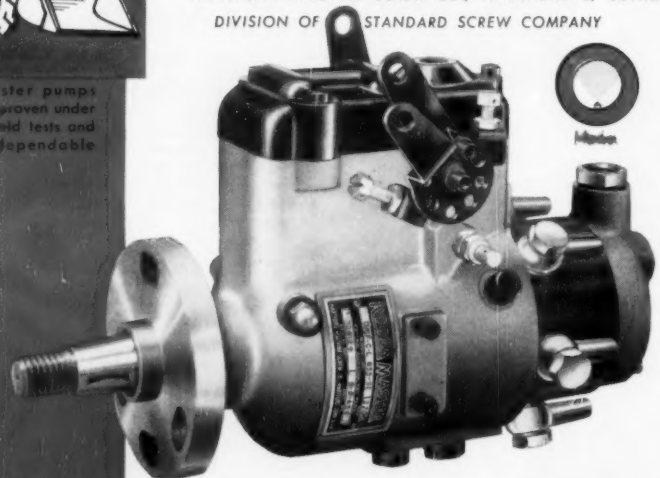
Only one model size is adaptable for either a 2, 3, 4, 6 or 8 cylinder engine. Compare its initial cost and installation cost for further proof that the best costs less.

HMS ROOSA MASTER makes good diesels better

HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
DIVISION OF STANDARD SCREW COMPANY



Roosa Master pumps have been proven under extensive field tests and years of dependable service.



YOU CAN DEPEND ON THE DIESEL THAT DEPENDS ON ROOSA MASTER

people and plants

Hercules Motors Names Director of Sales

A. D. Marks, manager of the foreign division of Hercules Motors Corp. since 1945, has been named director of sales, according to W. L. Pringle, president.

Mr. Marks graduated from the U. S. Naval Academy at Annapolis in 1927. He has been identified with submarine commands in Chinese and Hawaiian waters and served as assistant head of the internal combustion engine section of the Navy's Bureau of Ships.

W. F. Pressnell

Sales & Service Mgr. Returns

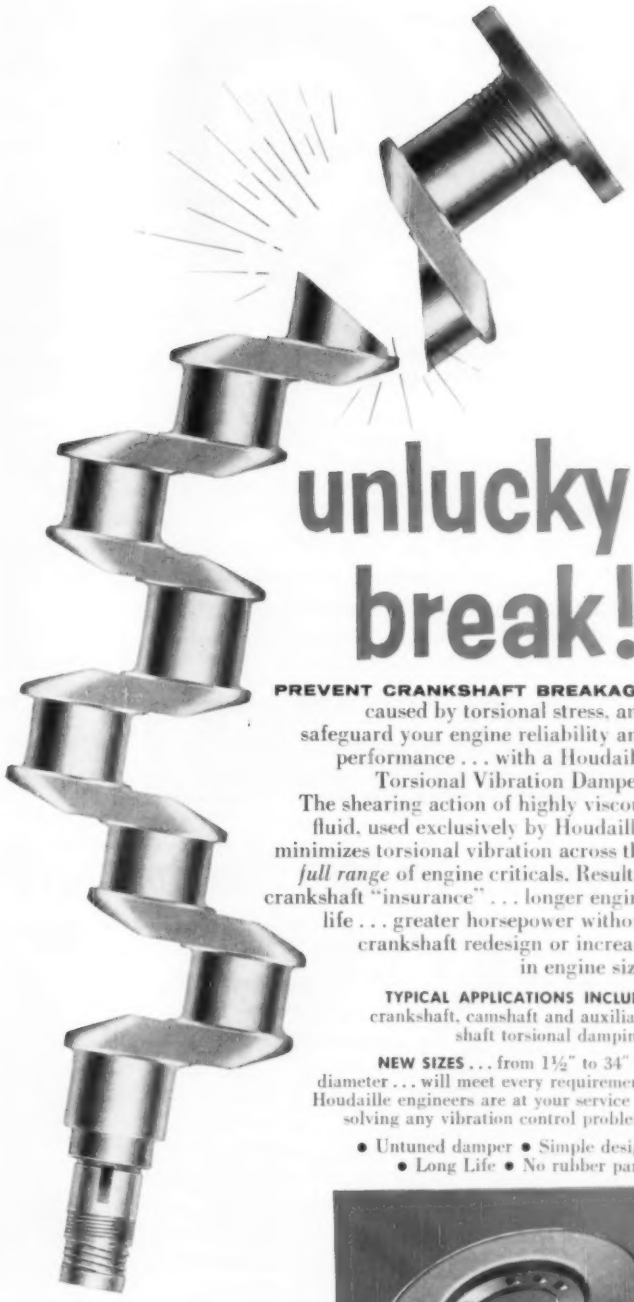
R. G. Jeffery, owner & manager of Hancock Diesel Service Co., Findlay, Ohio, has announced the return of W. F. Pressnell as sales & service manager. Mr. Pressnell will supervise sales activities throughout U. S. and Canada.

He has had extensive experience in diesel sales and sales promotion, his immediate previous affiliation being with Fairbanks-Morse.

Paradynamics Inc. Buys Four Wheel Drive Auto Co.

Controlling interest in Four Wheel Drive Auto Co., has been sold to Paradynamics Inc. G. E. Mallinckrodt, president of Paradynamics Inc. was elected chairman of a new FWD board of directors with F. Lyons former chairman continuing as a director.

The stock purchase weds FWD, pioneer manufacturer of custom-engineered 4- and 6- wheel-drive trucks with a young technological corporation which in its six years has been outstanding in mechanical and electrical developments, particularly in the general industrial and internal combustion engine fields.



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• Untuned damper • Simple design
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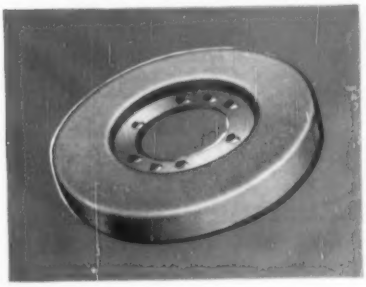

GET THE FACTS on design, performance and specifications. Write for FREE TECHNICAL BULLETIN on Torsional Vibration Dampers.

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Write for a copy of the ADS DIRECTORY so that you can locate the MEMBER SHOP in your vicinity. Remember — ONLY THE BEST CAN QUALIFY

ASSOCIATION of DIESEL SPECIALISTS, INC.
For information contact: S. E. Franklin, Secretary
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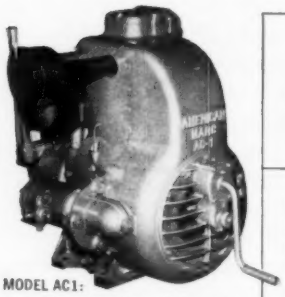

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Air-cooled, one-cylinder, four-cycle. 6.5 BHP @ 1800 RPM. Wt.: 220 lbs.

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new literature

(*Continued from Page* 91)

Filter Replacement Cartridge Catalog

A new 12-page catalog published by Walker De Luxe Products shows and discusses in detail their Duocron oil replacement cartridge.

Duocron is a 2-stage, full-flow cartridge featuring a new cotton-devised filtering material, Alpha Cellulose, in double thick sheet form.

Cat Maintenance Guide

A Maintenance Guide for Caterpillar No. 933, No. 955 and No. 977 Traxcavators has been prepared especially for operators. The new booklet is intended to supplement the more detailed information found in Caterpillar "Operation And Maintenance Instructions."

It is filled with 106 full-color illustrations of useful service tips. Written in narrative form, the 30-page booklet explains how one Traxcavator owner improved machine performance and longevity through good maintenance practices. Cartoons are used to simplify explanations.

Folder On Farr Air Filtering Equipment

Locomotive diesel engine air filters, silencers and filter adaptors made by the Farr Co. are covered in an illustrated folder now offered by this company. Filter selection data in table form is given for every major locomotive diesel in this country. Information is also given on how to order, how to apply and to install Rotonamic air cleaners.

Petroleum Sulfonates

L. Sonneborn Sons, Inc. has prepared a 12-page booklet on the origin and characteristics of petroleum sulfonates. It details behavior, functional properties and applications for its complete line.

Typical tests and end-uses are charted. Industries covered include manufacture of lube oil and fuel oil additives, crude oil emulsion breakers and oil well drilling muds.

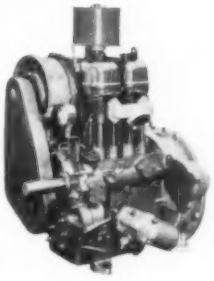
Lubrication Guide Contains Important Information

A guide to correct lubrication of internal combustion engines—gasoline, diesel, dual-fuel and natural gas engines—is available from the Sinclair Refining Company. Now in its Sixth Edition, it lists all engines produced in this country, plus popular makes from other countries. Model, type of engine (diesel, gas, dual-fuel, etc.), application (automotive, stationary, marine, locomotive), cycle, number of cylinders, bore and stroke, and rating are given along with the lube oil capacities (crankcase, base or reservoir as the case may be) and the recommended lubricant. Also given are fuel specifications recommended by major engine manufacturers. This is a valuable booklet for anyone involved with engines and their operation to have. For your copy use the Reader's Service card in the back of this magazine.

(*Continued on Page* 100)

INTRODUCING A NEW LIGHTWEIGHT AIRCOOLED DIESEL ENGINE

Dumper powered by a PETTER 12.5 HP PC2 diesel engine.



The PC, an addition to the current range of PETTER engines, is manufactured in 1, 2, 3, and 4 cylinder configurations at a continuous speed of 3000 RPM and a horsepower rating of 6.25 per cylinder.
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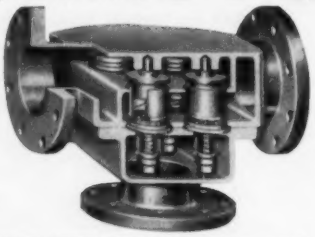
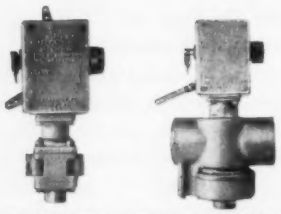
AMOT ENGINE CONTROLS

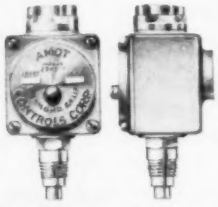


THERMOSTATIC VALVES, for jacket water and lube oil temperature control. Self contained, modulating, use no external bulbs. Sizes 1½" to 6". Temperature settings 75°F to 195°F.



MECHANICAL SAFETY CONTROL VALVES, used to shut down engines and compressors in event of oil pressure failure, overspeed, overheating of jacket water or lube oil, etc.

VENTED GAS VALVE, diaphragm operated will shut off the fuel gas and vent the manifold when used on internal combustion engine applications. Made in 2". 3" and 4" sizes.



SAFETY CONTROL SWITCH will flash warning signal, sound an alarm or close a solenoid fuel valve on overheating of jacket water or lube oil, or pressure failure of lubricating system.

AMOT CONTROLS CORPORATION

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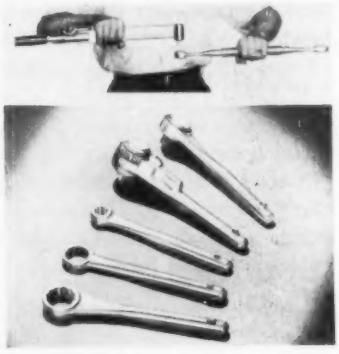
new literature

(*Continued from Page* 99)



New Multi-Purpose Torque Wrench Described

P. A. Sturtevant Company's new brochure describes their completely new approach to high torque application requirements. A new series of adapters are used to increase the range of a conventional low-capacity torque wrench to as much as 900 ft lb. For example, a normal 300 ft lb capacity torque wrench can be increased to 600 or 900 ft lb.

This new torque wrench and adapter combination permits the buying of only one torque wrench for many torque requirements.

New Relief Valve Catalog

Catalog, No. 110, recently put out by The Tuthill Pump Co., describes the company's line of adjustable, spring-actuated relief valves. Catalog 110 includes performance curves, complete dimensions, parts specifications, cutaway drawings and photographs of these valves. Operating and adjustment characteristics are fully explained.

Bulletin On Solid Film Lubrication

An all-purpose solid film lubricant, #4396, considered a high-load carrying solid film lubricant, is given complete technical coverage by Electrofilm, Inc., in a 4-page data sheet. The new bulletin includes data on wear life versus load at various speeds, along with friction properties of the dry lubricant, its physical properties and data on fluid immersion tests.

(*Continued on Page* 103)

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new literature

Bulletin Describes Rockwell Liquid Meters

A 2-page bulletin (OG-414) describing Rockwell "961" nutating disc meters designed to measure lubricating oils, kerosene, diesel fuel and gasoline has been issued by Rockwell Mfg. Co.

A new 2-page bulletin (OG-352) describing the Rockwell line of "Five-Pointer" industrial liquid meters has been also issued. It emphasizes the 1-in., 5000-psi oscillating piston-type meter and illustrates its oscillating piston principle.

Blackmer Hand Pump Catalog

A new 8-page catalog, using more than 40 pictures and drawings, describes the complete line of Flomaster hand pumps made by the Blackmer Pump Co. These hand, or barrel pumps, handle liquid materials from drums, barrels, underground and skid tanks and storage vats. It also provides a pump selection chart which describes each model.

Spiral-Wound Metal Gaskets

Guardian spiral-wound metal gaskets are covered in a new booklet by Garlock Packing Company. They are recommended for use against oils, gases and liquids in high pressure, high temperature applications. Design factors and outstanding features are charted for each type and size available.

The Garlock gaskets are made of spiral-wound strips of vee-shaped preformed stainless or cold-rolled steel alternated with layers of asbestos or Teflon.

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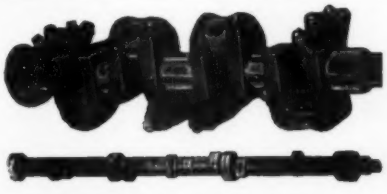
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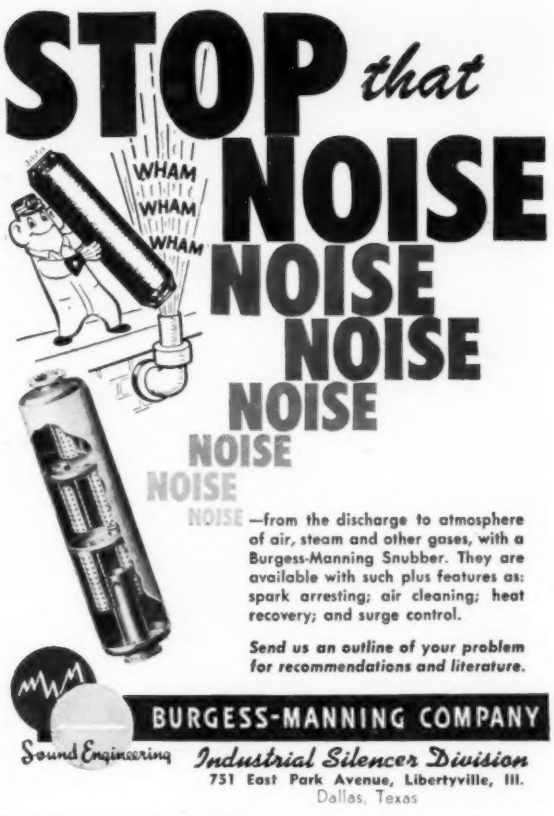
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Diesel Injector Parts
Compressor Bodies and Discs
Grooved lap plate permits lapping of compressor bodies without removing stud.

new literature

(*Continued from Page* 103)

Bulletin Describes Nugent's Disposable Filter Cartridge

Bulletin 7E published by Wm. W. Nugent & Co., Inc. shows and describes their new bag-type filter using an inexpensive, completely-disposable filter cartridge. It is no longer necessary to remove the dirty bag from the center spool and separating mats, clean spool and mats and attach a new bag. The new cartridges have bag, spool and separating mats constructed as a single unit, and are disposable when dirty.

Booklet On Solving Pumping Problems

Form 3060, a 36-page booklet called "How To Solve Pumping Problems", is available from Roper Hydraulics, Inc.

The booklet first gives a general explanation of rotory gear pumps then discusses factors involved in pumping problems. Sample problems and solutions are given. Also given are: technical data on friction loss in hose, pipes and fittings; cylinder displacements; viscosity of crankcase oils, fuel oils and conversion chart; viscosity and specific gravity of common liquids; conversion tables and conversion factors; electrical data; materials of pump construction; and head-to-pressure conversion tables.

Booklet Features Tachometers

Advantages of speed indication in truck, tractors, railroads and industrial diesel engines are discussed in booklet #58 issued by the Jones Motrola Corp. Included in this booklet is a series of line drawings with dimensions showing various ways in which Jones tachometers may be installed in different applications.

Bulletin Summarizes Superior Diesel Line

Bulletin #116 gives a brief summary of the Superior line of diesel, gas, and dual-fuel engines with applications in the petroleum pipe line industry. This bulletin has been issued by the White Diesel Engine Div. of The White Motor Co.

The 4-page, 2-color catalog lists 19 models of six basic engines to meet a variety of pipe line power requirements. Product and in-use photos, dimensions, and specs are included along with national sales and service locations.

Magnaflux Portable Kit Folder

Two folders available from the Magnaflux Corp. illustrate, describe and explain how to use their new Zyglo ZA-43 portable kit for Black Light test. The kit includes: Zyglo-Pentrex ZL-22, a new bright penetrant which locates clearly cracks and other defects; and a ZB-23A 100-w Black Light.

Packing Handbook

A packing handbook which details a wide variety of packings, gaskets and seals and their materials of construction and uses, has been published by The Garlock Packing Co. Bulletin #AD-162, also contains a detailed table listing the effect of numerous gases, liquids and solvents on packing materials.

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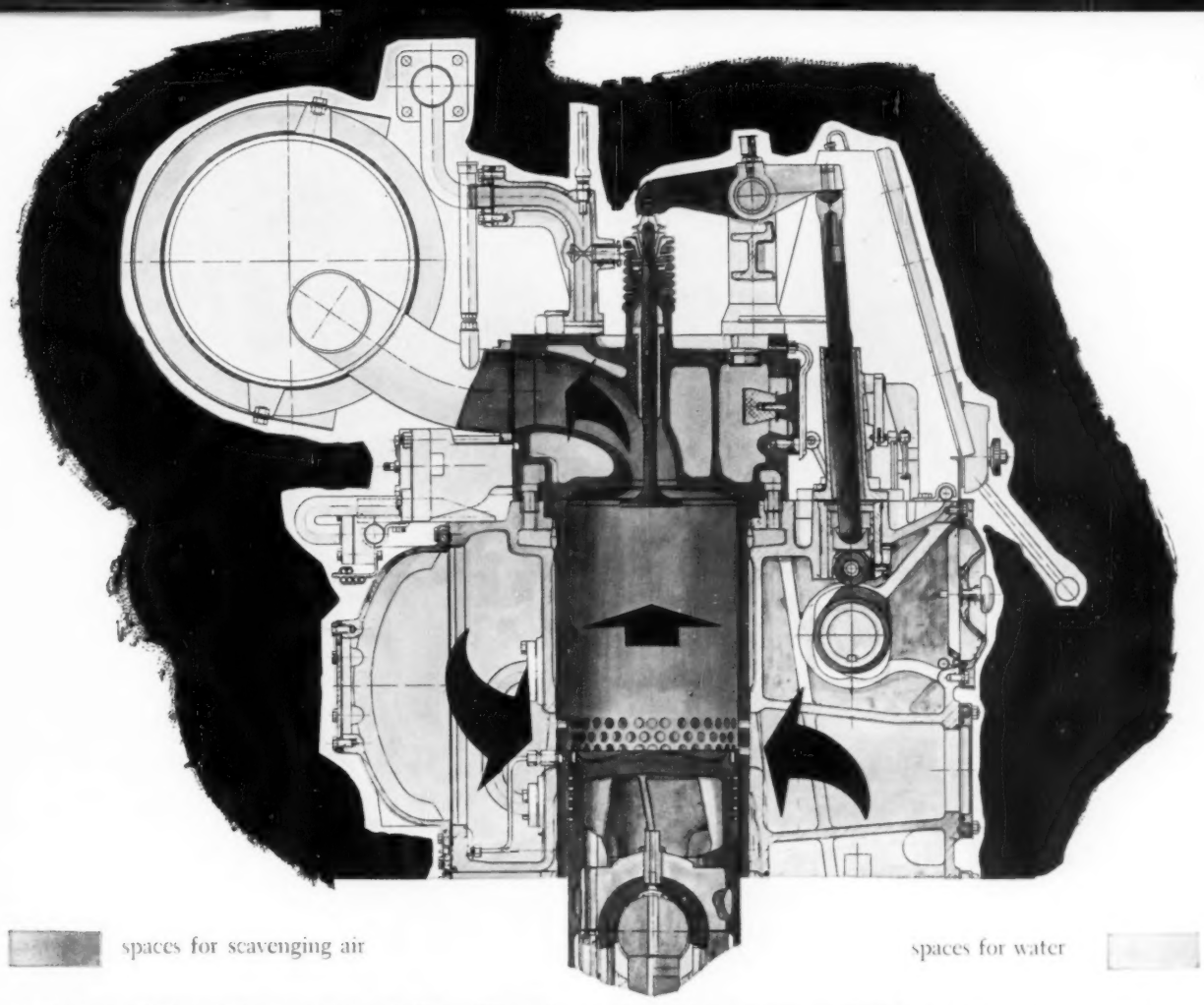

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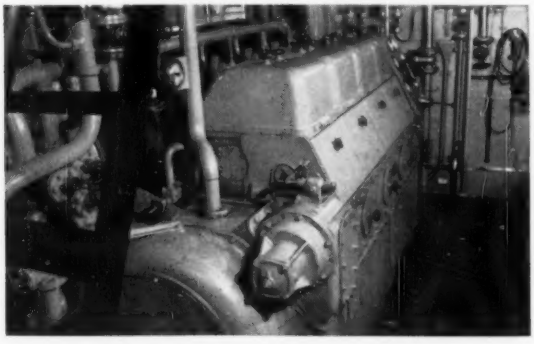

For high stroke volume: The effective stroke is greater because there are only air inlet ports thereby reducing the necessary height of the porting in the cylinder. An unsymmetrical valve-timing diagram permits an additional air charge.

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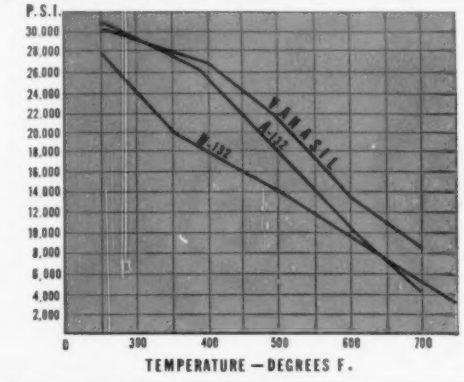
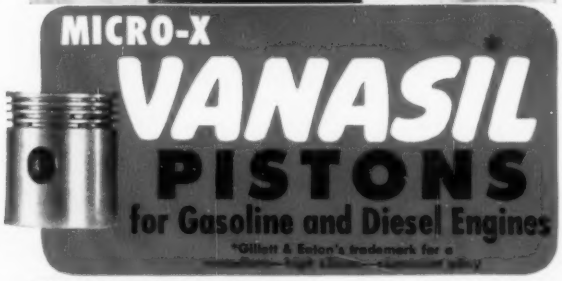
A COMPARISON OF TENSILE OF VARIOUS ALUMINUM ALLOYS AT ELEVATED TEMPERATURES





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